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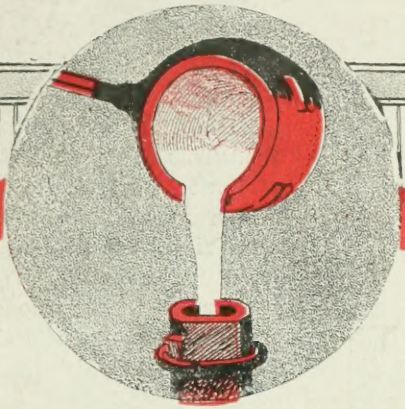
CANADIAN MACHINERY AND MANUFACTURING NEWS

A weekly newspaper devoted to the manufacturing interests, covering in a practical manner the mechanical, power, foundry and allied field. Published by The MacLean Publishing Company, Limited, Toronto, Montreal, Winnipeg and London, Eng.

Vol. XVIII—No. 7 Publication Office: Toronto, August 16, 1917 Subscription Price $3.00 per Year



SaBeN ExTrA
HIGH SPEED STEEL

The most economical and efficient steel for machining shells

"EXTRA" DIE STEEL—
another good one

Manufactured by
SANDERSON BROS. & NEWBOULD, Limited
SHEFFIELD, ENGLAND

H. A. DRURY COMPANY LIMITED

MONTREAL TORONTO NEW YORK

SABEN

The Publisher's Page

TORONTO August 16, 1917

Replies from Russia, England, Holland, Australia, India, France, Italy, Norway and Sweden, South America and Africa:

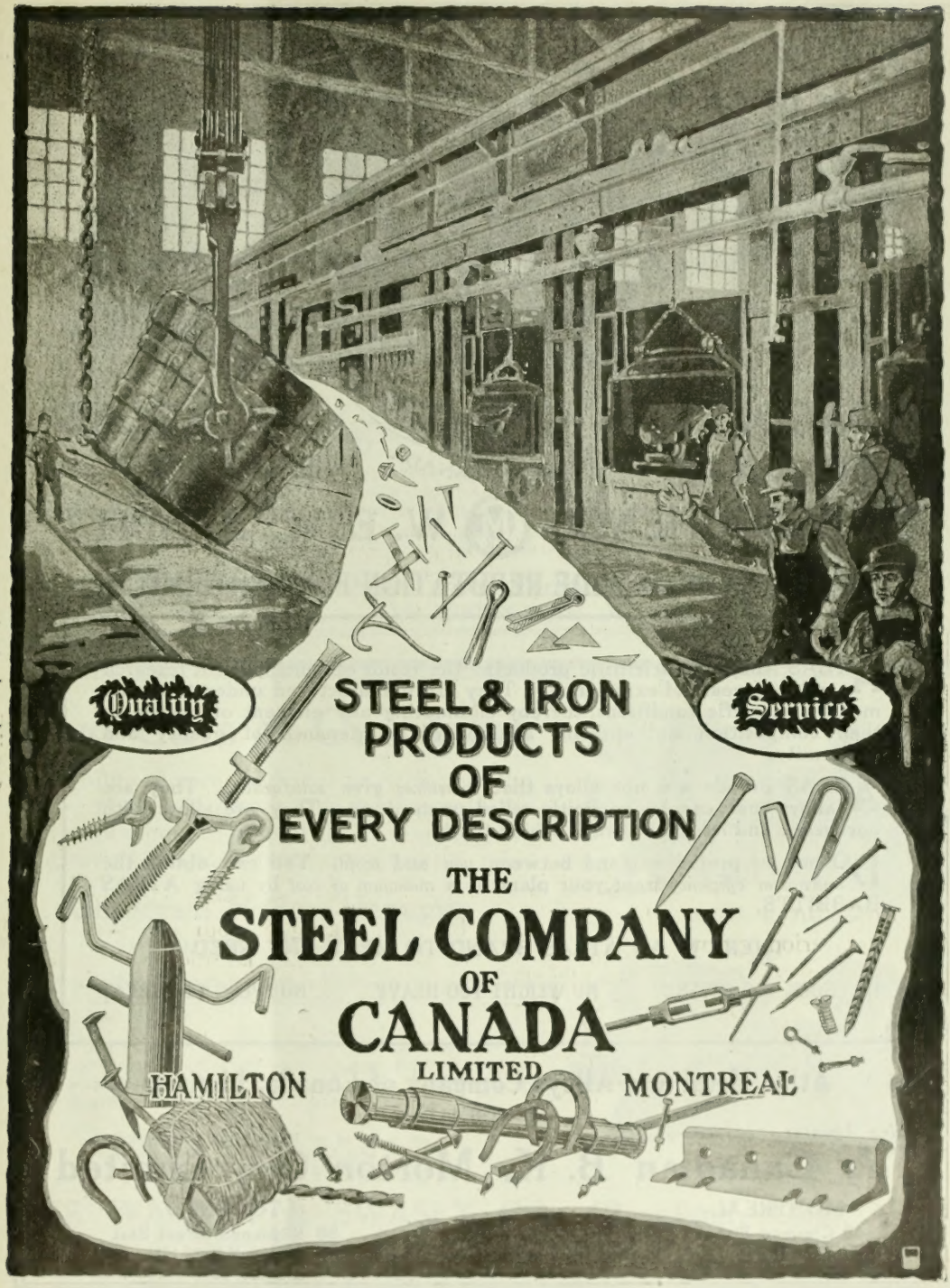
TRANSATLANTIC Mail Service nowadays is slow, but fairly sure judging by our own experience. It is now a little over a year since our first Export Number was mailed to the four corners of the earth. We anticipated and expected that results would be slow in coming. We realized and our advertisers realized that foreign business could not be grabbed off overnight. They and we expected to wait and there was no disappointment when a big volume of replies was not received in a month from the date of our first Export Number.

A year, especially the year of our Lord 1916-1917, is a comparatively short period of time compared with the life of any firm of repute, and yet at the end of a year results are coming home! The seed, carefully planted, is ripening fast. During the past few days several advertisers have gone out of their way to tell us of replies they have received from big importers in other countries. Some of these replies refer to our earlier Export Numbers. Others to more recent issues.

Connections are formed abroad now, more easily perhaps than in normal times. Connections formed now are likely to last when normal times prevail again. "Missionary" work or the process of educating and securing the interest and friendship of foreign buyers takes time. War time pre-occupation and perhaps war time prosperity may be responsible for the failure of some firms to take advantage of the present opportunity of reaching out after export business some time,

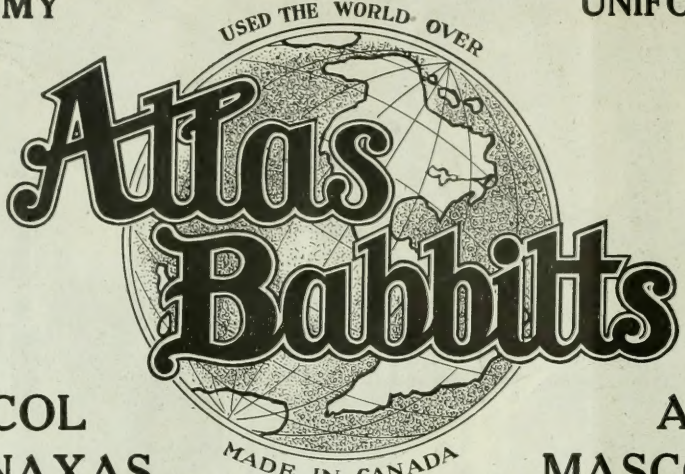
Now is the time to start foreign buyers thinking of your products. A year lost *now* may mean much more than you think.

If you are thinking about going after export business sometime, better make the decision and start the machinery now. Let us send particulars of our monthly Export Numbers. Our last Export Number ran 176 pages.



If any advertisement interests you, tear it out now and place with letters to be answered.

ECONOMY UNIFORMITY



AMACOL ATLAS
TENAXAS MASCOT
TIN TOUGHENED W. E. W. BABBITT

HAVE A WORLD-WIDE REPUTATION FOR UNIFORMITY

ATLAS Alloys are scientific products—the result of much patient research and long years of experience. They are manufactured under the most modern scientific conditions, thereby eliminating any element of chance in their composition and ensuring a standard maintenance of quality and uniformity.

ATLAS Brands are not alloys that *sometimes* give *satisfaction.* They are alloys that can be implicitly relied upon *always.* They are alloys with our *prestige* and *reputation* always behind them.

DO not let prejudice stand between *you* and *profit.* You can obtain the *maximum efficiency* from your plant at a *minimum of cost* by using ATLAS BABBITTS.

THERE IS AN ATLAS BRAND TO MEET ANY NEED

NO SHOCK TOO SEVERE NO WEIGHT TOO HEAVY NO SPEED TOO GREAT

Atlas Metal and Alloys Company of Canada, Limited
MONTREAL

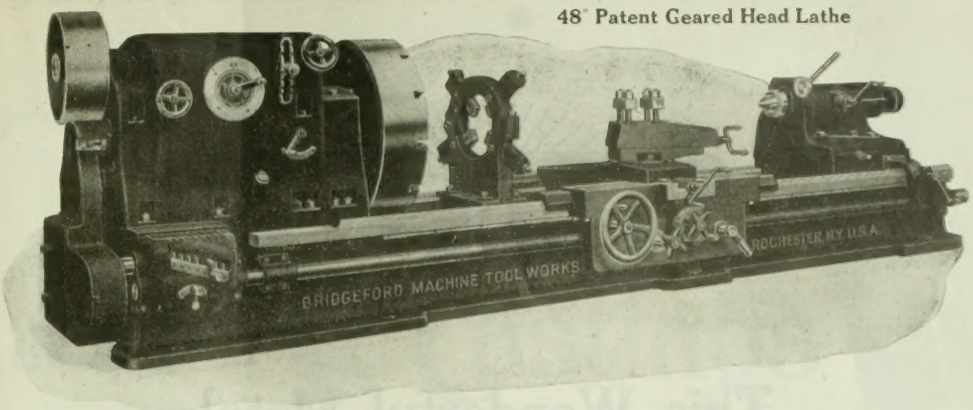
Sales Agents:

The Canadian B. K. Morton Co., Limited

MONTREAL
49 Common Street
Phone M. 3206

TORONTO
86 Richmond Street East
Phones M. 1472-1473

48" Patent Geared Head Lathe



The Bridgeford for Big Work

That's what this powerful Bridgeford is built for—big work. Has strength and rigidity sufficient to perform the heaviest kind of jobs with perfect accuracy—and it goes through them in record time. Smooth in action. Strongly constructed. Fifteen cutting speeds all easily changed.

Bridgeford's Lathes give maximum production at minimum cost. We'll be glad to give you a full account of what they will do. Write

Bridgeford Machine Tool Works, Rochester, N.Y.

161 WINTON ROAD

Two Cuts at One Time

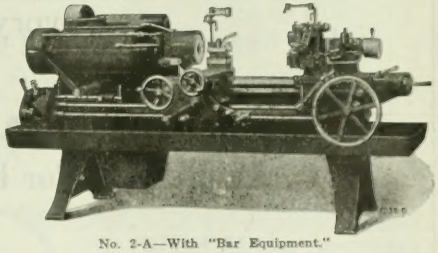
The ability to face, undercut or neck with the square turret while boring or turning with the hollow-hexagon turret contributes largely to the time-saving and economical output of the

Universal Hollow-Hexagon Turret Lathes

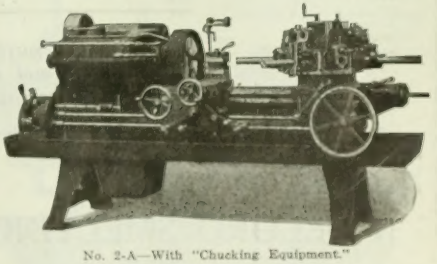
Separate feed shafts, each with ten individual feeds, operate the carriage and turret saddle independently, and provide the exact feed required for each.

And to this great advantage are added the other essentials for rapid and accurate production—excess power, extreme rigidity, great adaptability, and a power rapid traverse that saves time and conserves the energy of the operator.

Without obligation, ask us to show the saving on one of your typical jobs. Send blueprints with rough and finished samples.



No. 2-A—With "Bar Equipment."



No. 2-A—With "Chucking Equipment."

THE WARNER & SWASEY CO., Cleveland, Ohio, U.S.A

Canadian Agents: A. R. Williams Machinery Company, St. John, Toronto, Winnipeg, Vancouver; Williams & Wilson, Montreal Benson Bros., Sydney and Melbourne, Australia; A. Asher Smith, Sydney, Australia

This Wonderful Metal

is made in different Grades and can be adapted for
A MULTITUDE OF OPERATIONS.

Remarkable Results are Being Obtained

in machining Steel, Iron, Bronze, Brass,
Ivory, Celluloid, etc.

DIES OF ALL DESCRIPTIONS

are cast for hot or cold drawn work.

Write us for particulars, stating the class of work you are on, and what your difficulties are. Our Engineering Staff is at your disposal.

DELORO SMELTING & REFINING CO., LIMITED

Head Office - - DELORO, ONTARIO

TORONTO
200 King Street West

MONTREAL
315 Craig Street West

Steel Castings

No castings too small or too large for the capacity of our plant. Manganese, Vanadium, Titanium, Chrome, Nickel, castings for Marine, Railroad, Mill and hydraulic purposes are our specialty. Made true to specifications and pattern.

Illustration above shows Stern casting for Ice-Breaker, "John D. Hazen."

CANADIAN STEEL FOUNDRIES, LIMITED

Montreal, P.Q. Welland, Ont.

We guarantee shipment within 24 hours of receipt of order

"Extra" "Special" "High Speed" Tool Steels

SISCO

Made in Sweden from selected Dannemora Ore

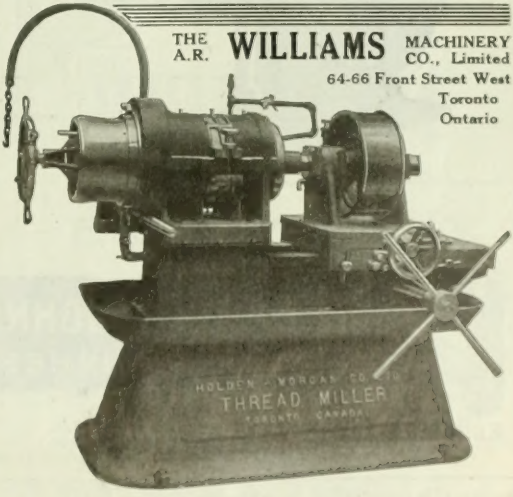
We also carry in stock Solid and Hollow Drill Steel, Die Blocks, "SISCO" Welding Wire, Drill Rod and Swedish Iron.

Swedish Steel & Importing Co., Ltd.
MONTREAL, QUE.

The Life of a Thread Miller

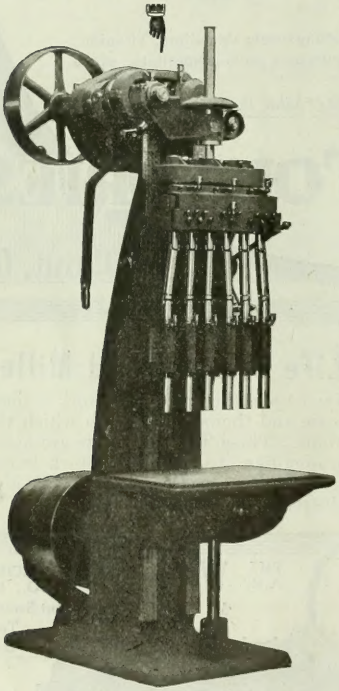
Depends not upon the amount of work it does, but the ease and thoroughness with which the work is done. These Thread Millers are noted for these qualities. Its quality of work is unrivalled. Our Service Department will give you all the particulars. *Write us!*

THE A.R. WILLIAMS MACHINERY CO., Limited
64-66 Front Street West
Toronto
Ontario



The Johnson Friction Clutch Is Being Used As A Part Of This Machine

Here



Courtesy of Foote-Burt Co., Cleveland, Ohio.

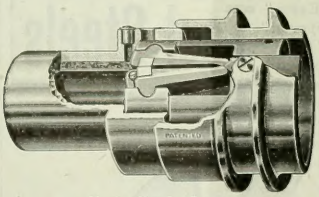
The Johnson Friction Clutch is used in the throw-out back gears in this new 15½ Foote-Burt Multiple-Spindle Machine.

"Records Are Much Better Than Promises"

That is the reason why we run the cut at the top of the page, driving home the record, "the Johnson Friction Clutch is being used as a part of this machine."

Week after week has the evidence been piling up as to the extensive use of the Johnson Friction Clutch in various types of machines.

And this record of wide use is duplicated by another record of satisfactory service.



Single Clutch—Interior.

The Johnson Friction Clutch embodies all the principles which make a perfect friction clutch. Our YELLOW DATA SHEETS and Booklet, "Clutches as Applied in Machine Building," explain this fully. Will you have them?

THE CARLYLE JOHNSON MACHINE CO.
MANCHESTER, CONN.

England— The Efandem Co., 159 Gt. Portland St., London, W., England. Sole Agents for the British Isles.

Canada— Williams & Wilson, Ltd., 320 St. James St., Montreal. Canadian Fairbanks-Morse Co., Limited, Toronto.

AUSTRALIA: Edwin Wood, Pty., Hardware Chambers, 231 Elizabeth St., Melbourne, Victoria.

JENCKES CLASS DB-2 AIR COMPRESSOR

If you understand compressors look over the following outline. If you are not acquainted with these machines it would delight us to give you an introduction.

Inlet Valves are of the Corliss type, the outlet valves of the disc type; flood type lubrication, allowing a continuous flood of oil over bearings, crank pins, etc., while in motion. Machine of the enclosed type.

JENCKES CLASS CB-1 AIR COMPRESSOR

If your requirements do not justify either of the above machines, just bear in mind that we have a very comprehensive range that will cover all usual and unusual needs. The above is equipped with inlet and outlet disc valves; splash gravity lubrication system; extra large bearings; machine entirely enclosed.

Jenckes Machine

Works: St. Catharines, Ont.
Works: Sherbrooke, Que.

The

Company, Limited

SALES OFFICES: 710 C.P.R. Bldg., Toronto; 505 E.T. Bank Bldg., Montreal, West Chester Ave., St Catharines, Cobalt, Ont., Exchange Bldg., Vancouver.

Electrite

Electric furnaces, automatically regulated, the most modern methods, and **the introduction of Uranium**—make this a steel of truly remarkably cutting properties.

We know "Electrite" cannot be bettered -- and stand ready to prove it to you

LATROBE ELECTRIC STEEL CO.

LATROBE, PA.

High Speed Steel

Uranium

High-Speed STEEL

The tools that are made with "Wolfram" High Speed Steel are warranted to be super-keen at the edge and super-strong at the neck.

WOLFRAM

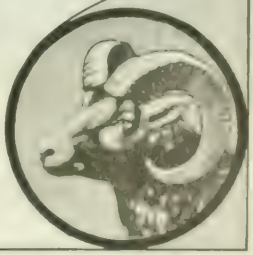
Embodies a true and permanent alloy of Tungsten, Chrome, Vanadium and Iron. No better High Speed Steel in the world.

VULCAN CRUCIBLE STEEL COMPANY

ESTABLISHED 1900

Aliquippa - Pa., U.S.A.

Represented at Canada's Ad Mission Nothing Ordered by Cable Letter Mentioning



If any advertisement interests you, tear it out now and place with letters to be answered.

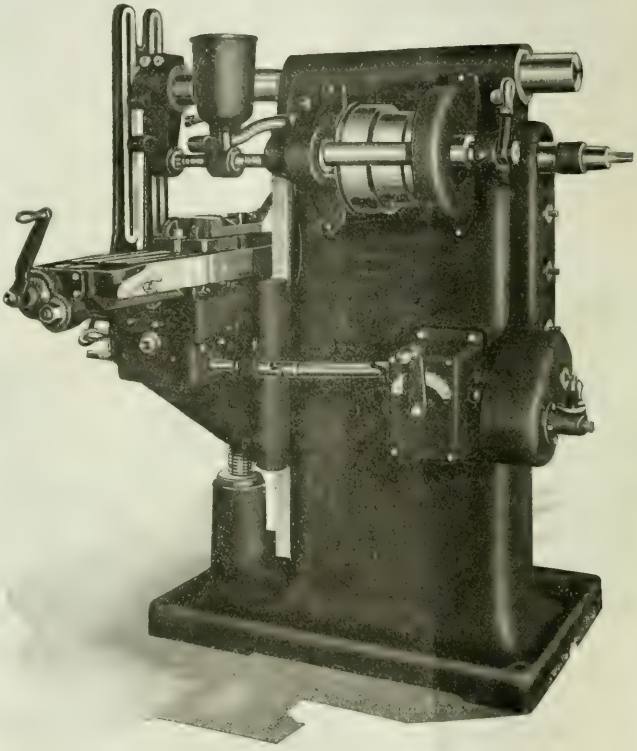
The Ford-Smith Machine Company

Adv't. No. 2

Miller Series

When Machinery of any kind has to be purchased, naturally the purchaser weighs carefully the respective merits of other manufacturers' products before he spends his money.

We are pleased to say that the number of Millers recently sold show that our machines are proving to be well worth while—otherwise why so many repeat orders?



You will no doubt, by this time, have noted the simplicity of our design—also its strong, rugged appearance. These features alone make this machine ideal for manufacturing work, where speed and accuracy are desired.

We should like you to have our catalogue if it is not already on your desk or file.

The Ford-Smith Machine Company, Limited

HAMILTON ONTARIO CANADA

Mention this paper when writing advertisers. It will identify the proposition about which you require information.

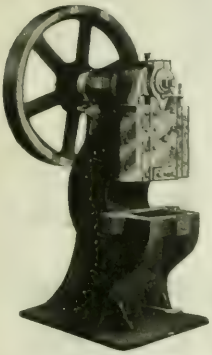
Sheet Metal Working Machinery of Any Description

B.B. Presses for

Quality, Efficiency,

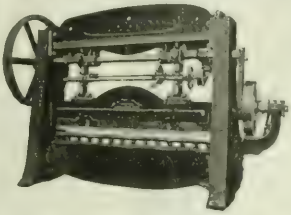
Durability, Speed,

Accurate Production.

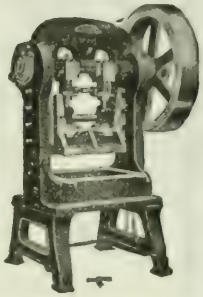


No. 2—G.A. Press

No. 126
Deep Throat Power Punch

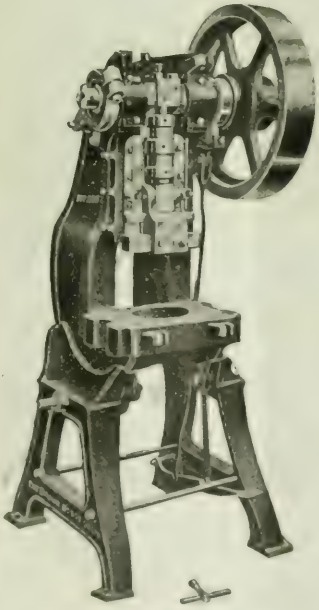


No. 500—Power Brake or Press



No. 20½—Power Press

B.B. Presses embody special features for minimizing maintenance cost of both machines and tools.



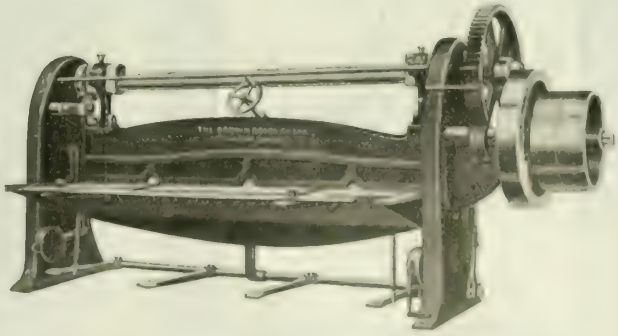
No. 200—Power Press

The Brown, Boggs Company, Limited

HAMILTON ONTARIO

MANUFACTURERS OF

Tinsmiths' Heavy Sheet Metal Working Machinery



No. 960—Overhead Shear

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STEEL

FOR
SHRAPNEL
SHELLS
AND SHELL BLANKS

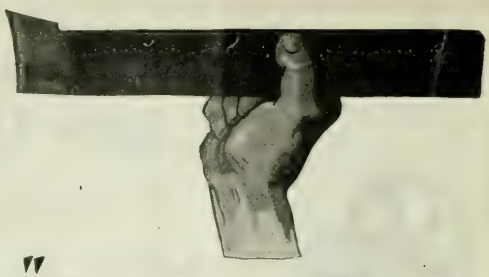
We are the only company in Canada producing steel ingots by the "HARMET" Liquid Process, a process that makes these ingots vastly superior to the ordinary kind, improving the physical properties and reducing the waste of ingot.

We can supply forgings of all shapes and sizes made of ordinary or "HARMET" Fluid Compressed Open-Hearth Steel on the Shortest Notice.

Nova Scotia Steel and Coal Company
Limited

Head Office: NEW GLASGOW, N.S.

Western Sales Office:
Room 14, Windsor Hotel, MONTREAL



"Red Cut Superior"

HIGH SPEED STEEL

YOU have thought of many qualities you would like to have in High Speed Steel Tools—such as cutting edges with long life, freedom from brittleness, great reserve strength and toughness to resist shocks and strains, tools that would not require special heat treatment, tools that would take deep roughing cuts or fine smooth finishing cuts, and in addition, could be worked at higher speeds than you ever dreamed of. All these virtues and many more are contained in "Red Cut Superior", a First Quality High Speed Steel. Furnished in Annealed Bar Stock, Discs, and Treated Tool Holder Bits.

Are your tools made of Red Cut?

Send for folder

VANADIUM-ALLOYS STEEL COMPANY
Pittsburgh, Pa.
Works at Latrobe, Pa.

ESTABLISHED 1870

WM. ATKINS & CO., LTD.

TRADE MARK
"WACO"

Reliance Steel Works
SHEFFIELD, ENG.

TRADE MARK:

TRADE MARK
of the Famous

"WACO

Brand

High Speed Steel and Twist Drills

"DOUBLE WACO" Quality

Specially Adapted for all kinds of
MUNITION WORK

"Turtle" Brand
High Class Tool Steel, Files, etc.
of all descriptions.

For particulars apply to our
Sole Representatives for Canada

GEO. A. MARSHALL & CO.

70 Lombard Street Toronto, Ontario

The

Fairley Davidson Steel Co., Inc.

SPECIALISTS

	Brand Name:
Hot Working Steels	"Xtof" and "Precision"
High Strength Steels	"Hehtemnd"
High Speed Steel	RUSHITOFF No. 6
Tool and Die Steels	"Fondwot" and "Giant"
Magnet Steels	Tungsten or Chrome
Non-Changeable Die Steel	Nugget "B" oil hardening

CHROME VANADIUM, oil hardening or case hardening

CHROME NICKEL, oil hardening or case hardening

Steam Hammer Forgings to Sketch

We guarantee to supply the correct steel at once, eliminating costly experiments

We carry a complete stock at our New York Warehouse, 124 Maiden Lane, New York City

Canadian Agents:

The Canadian Utilities Steel & Engineering, Limited

149 Craig Street West, Montreal, Canada

We carry a complete stock at our Montreal Warehouse

Works: LONGUEUIL, QUE.

CANADIAN MANUFACTURERS

are you using Steel

MADE IN CANADA?

We are manufacturing at our works at LONGUEUIL, QUE.

SPECIAL HIGH SPEED AND CARBON TOOL STEELS, MISCELLANEOUS SHOP TOOLS, GAUGES, Etc.

ARMSTRONG WHITWORTH of CANADA

LIMITED

HEAD OFFICE: 298-300 St. James St., Montreal

Branches: 27 King William Street, HAMILTON
Dominion Bank Bldg., TORONTO
McArthur Bldg., WINNIPEG, MAN.

Coal
Coke
Iron Ore

Pig Iron

Victoria FOUNDRY & MALLEABLE

Made by The Canadian Furnace Co.
Port Colborne, Ontario, Canada.

M.A. HANNA & CO.

Sales Agents, CLEVELAND

Canadian Office:

703 C.P.R. Bldg., Toronto

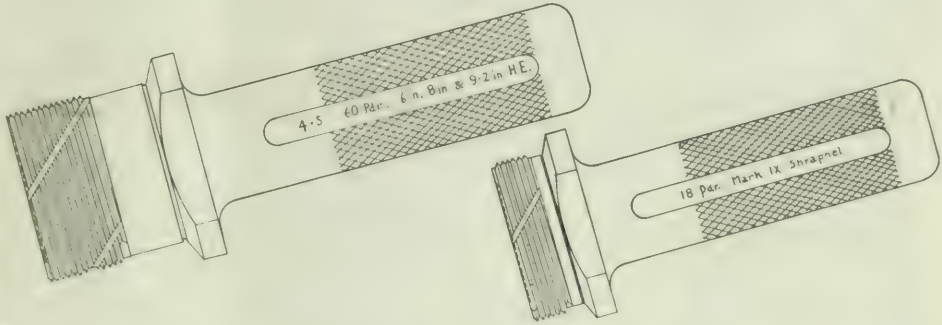
TEXTILE BELTING and PACKINGS

HIGH SPEED TWIST DRILLS

J.R. BAXTER & COMPANY LIMITED, MONTREAL.

and GENERAL MACHINERY SUPPLIES

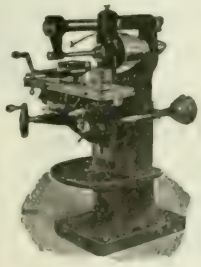
FUSE HOLE GAUGES



Manufacturing and inspection fuse hole gauges for all size shells. A surplus stock enables us to ship immediately.

Windsor Machine & Tool Works

Windsor, Ontario



CUT YOUR SHOP COSTS

Nobody would think of putting 16-inch lathe work on a 30-inch lathe, then why leave small parts on a large Milling Machine?

A Steptoe Hand Miller or small power feed can be handled quickly and will cut your production cost. You will have less money invested in your Milling Machines and have more machines to do the work.

That same principle applied to your small planer work will cut the cost of planer work.

A Steptoe Shaper will do the work faster because it can be handled quicker.

The John Steptoe Company, CUMMINSVILLE CINCINNATI, OHIO, U.S.A.

Canadian Representatives: Garlock-Walker Machinery Co., Toronto, Ont.

If any advertisement interests you, tear it out now and place with letters to be answered.

One of the

Steels of the Century

Centurion High-Speed

Made from the **BEST** Materials

Iron, Tungsten, Chrome, Vanadium

Melted by the **BEST** Process

The Crucible Furnace Method

Handled by the **BEST** Workmen

Melters, Forgemen, Annealers, Metallurgists

CONSEQUENTLY

Will do the **BEST** Work

Quality ***Delivery*** ***Service***

We have a catalog waiting for you. Write for it.

THE CENTURY STEEL CO. OF AMERICA

MANUFACTURERS OF HIGH-GRADE CRUCIBLE STEELS

Works:
POUGHKEEPSIE, N.Y.

Sales Offices:
120 BROADWAY, NEW YORK

Chips Turned With a Tool of
URANIUM
High Speed Steel

You must have good steel in your cutting tool where you have turning operations that are severe; the making of rolls for steel mills, for example. The steel used is a very hard, tough metal, and it is necessary to remove this metal to some depth.

The chips tell the story. There are nearly two pounds of them in the man's hands. The roll is thirty inches diameter and the feed is 13 64 inch per revolution, while the depth of cut is over an inch. The cutting speed is about 18 feet per minute. A 50 H.P. motor is required to operate the machine.

Uranium Steel is used for this cutting tool. It is the only steel that several concerns have found can stand the pace. Uranium is an element which gives high-speed steel remarkable toughness and life.

Consult your steel man or write us

Standard Alloys Company

Forbes and Meyran Avenues
PITTSBURGH, PA.
U.S.A.

IF YOU WANT THE

BEST BASE PLUGS, BUY BANFIELD'S

Have in stock for immediate shipment either threaded or bevel Plugs for 4.5", 5" and 6" High Explosive Shells. These are shipped subject to acceptance of Government inspector at your plant.

Capacity, 3,000 per day. *Write for prices.*

EDWIN J. BANFIELD

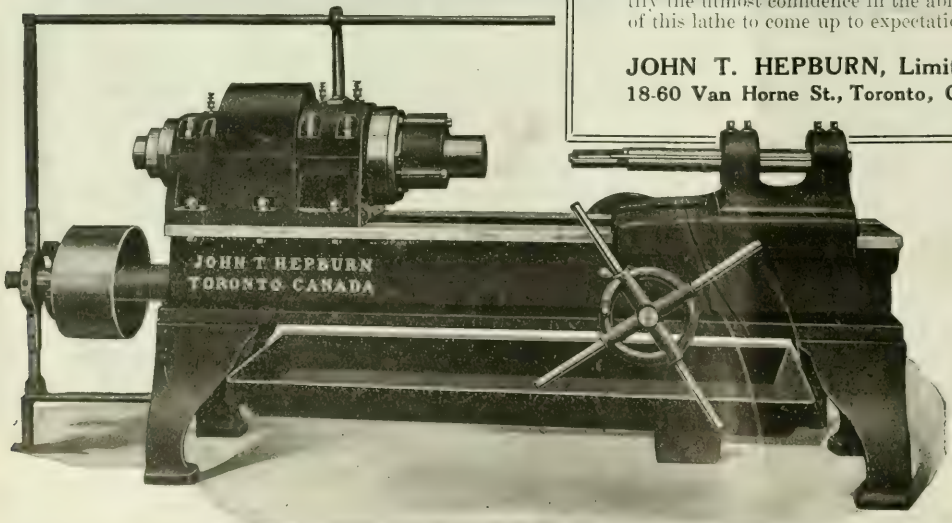
STAIR BLDG. ∴ TORONTO, ONT.

Manufacturer of Plug Milling Machines for above size shells. Prices and deliveries on application.

Are You Getting Results?

Results are dependent upon two things: speed and quality. If you get speed without quality, yours is a losing proposition. This Hepburn 6" boring lathe gives both speed *and* quality. The results obtained by Canadian users justify the utmost confidence in the ability of this lathe to come up to expectations.

JOHN T. HEPBURN, Limited
18-60 Van Horne St., Toronto, Ont.



Mention this paper when writing advertisers. It will identify the proposition about which you require information.

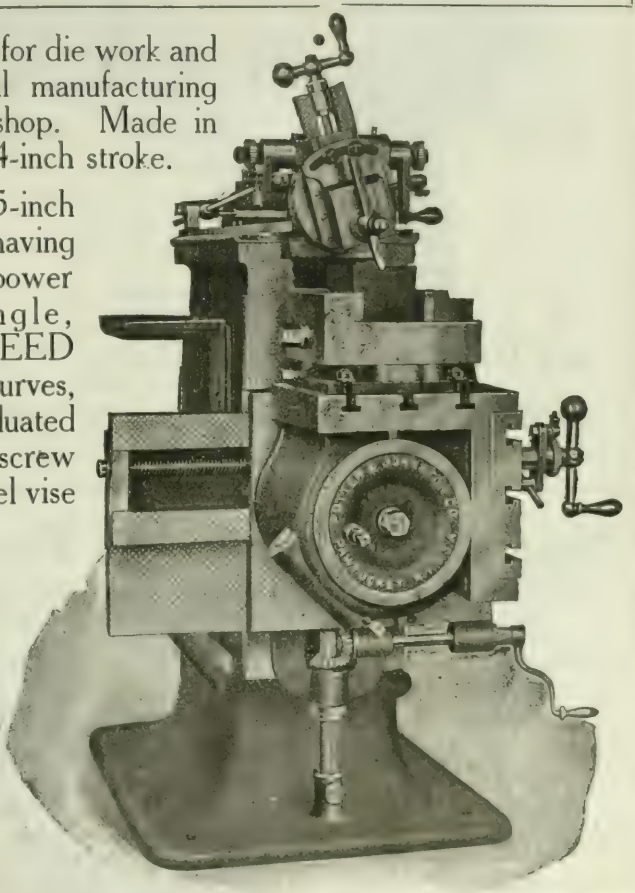
Potter & Johnston 15-inch Universal Shaping Machine

15-inch Stroke — 24-inch Stroke

The standard of efficiency for die work and tool room service, general manufacturing purposes and the repair shop. Made in two sizes—15-inch and 24-inch stroke.

Illustration shows the 15-inch model with swivel table having auxiliary tilting side, power down feed on any angle, POWER ROTARY FEED for planing internal curves, automatic feed stop, graduated collars on tool head feed screw and table feed screw, swivel vise with graduated base.

The simplicity of design, convenience of operation, extreme care exercised in their manufacture, and the many universal features of this machine, combine to make it the most efficient and reliable tool of its type.



WRITE FOR PRICES AND DELIVERIES

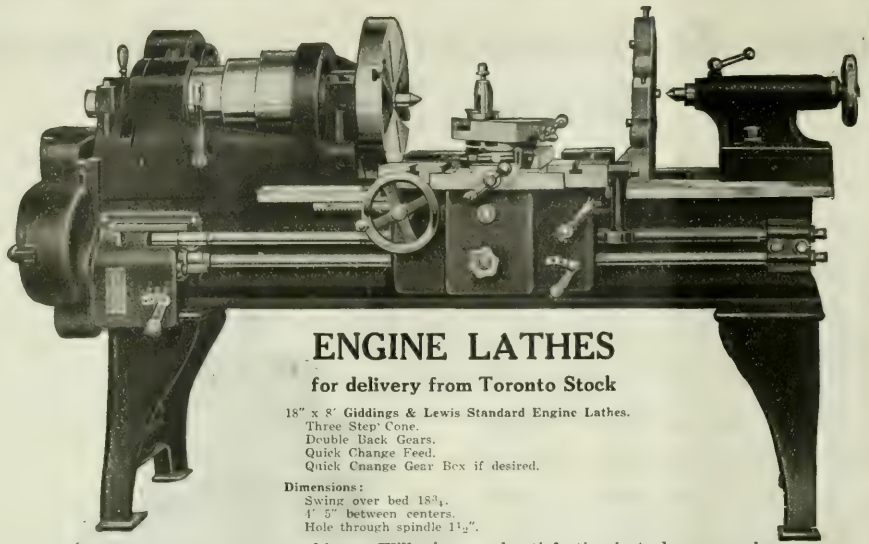
Canadian Offices **Potter & Johnston Machine Co.,** Pawtucket, R.I.

ROELOFSON MACHINE & TOOL CO., LTD.

Head Office: 1501 Royal Bank Building, TORONTO, CANADA

Works and Warehouse: GALT, ONT., CANADA

If any advertisement interests you, tear it out now and p[illegible]



ENGINE LATHES

for delivery from Toronto Stock

18" x 8' Giddings & Lewis Standard Engine Lathes.
Three Step Cone.
Double Back Gears.
Quick Change Feed.
Quick Change Gear Box if desired.

Dimensions:
Swing over bed 18¾.
4' 5" between centers.
Hole through spindle 1½".

These are strongly built, accurate machines. Will give equal satisfaction in tool-room or shop. The following extras can be furnished if desired: Taper, Relieving or Draw-in attachment, Waving attachment, Hexagon turret on carriage, Pan pump and piping.

Write for full specifications and prices.

Garlock-Walker Machinery Co., Ltd., 32 FRONT ST. WEST, Telephone MAIN 5346 **Toronto**

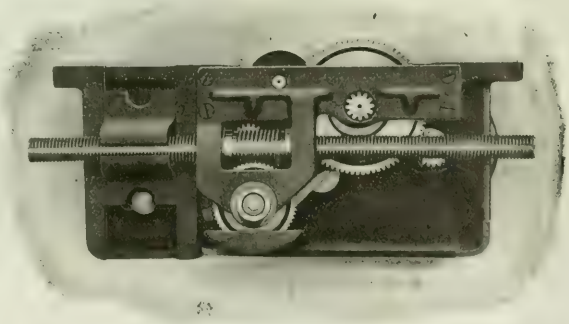
Note the Strength, the Few Working Parts

CISCO APRON

No Wear or Tear to the Lead Screw

No Complicated Parts

No Bevel Gears



No Worrying About Repairs

No Give to Any Part

No Jumble of Levers or Pull Pins

THE LATHE WITH THE PULL

WILL SATISFY EVERY CANADIAN CUSTOMER—THAT'S YOU

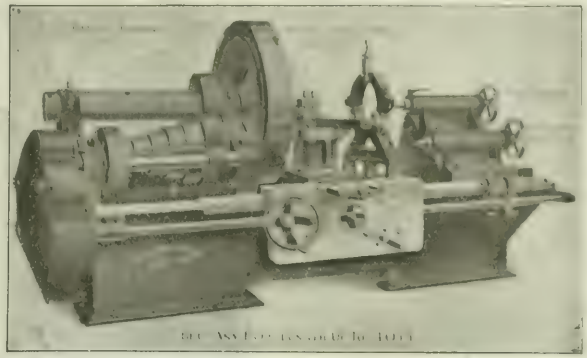
Sold by **The A. R. Williams Machinery Co. Ltd**

Made in 14"-16"-18"-24" by **The Cincinnati Iron and Steel Co.**

One Ship-building Plant

wrote to six different Lathe-Builders

and bought McCabe's "2-in-1" Double-spindle Lathe—on a 30-ft. bed—because it was "different" and built especially for such a wide range of work.



McCABE'S "2-in-1" Double-Spindle Lathe 26-48 inch Swing
As a 48 inch Triple-Geared Lathe

What other big Lathe can you get and have full use of your Lathe whether you have big or small work?
What Lathe Manufacturers except McCabe could make such a low price possible?
No other Lathe builder turns out 18-inch Lathes in such big lots at a time, making the parts all duplicate and interchangeable.
And in addition to the 18-inch Triple-geared Lathe, the 26-inch is the "Lathe plus". Covers More the others cost at no extra cost
DOUBLE service-convenience and capacity all described in Latest Bulletins.

J. J. McCABE, 149 BROADWAY, NEW YORK

SIDNEY LATHES ARE SPEEDY

SIDNEY for SERVICE

They have to be!

These are no days for slow machines. These are no days for "slacker-lathes"—not when the Big Drives over in France begin in the splendid factories of North America. Sidney-for-Service Lathes are performing in a wonderful manner—in Canada, in the United States. They are Speedy, Sturdy—and possess Staying qualities.

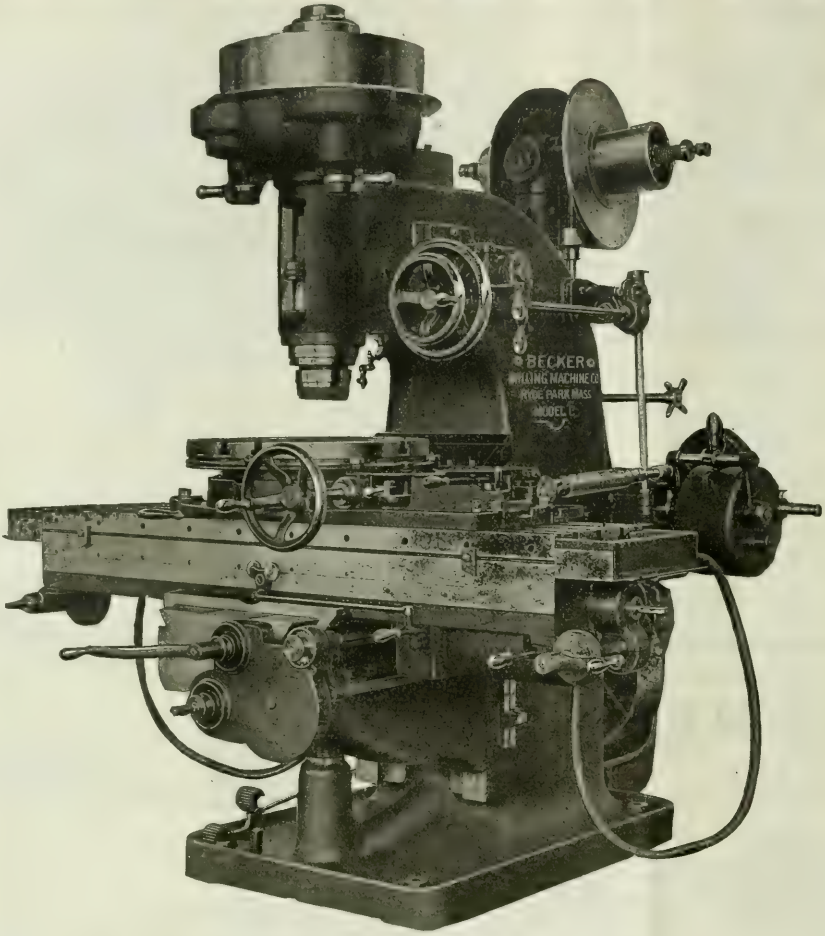
Get Bulletin 30 from our company, or write to either of our Canadian Agents who will give your inquiries prompt attention.

Foss & Hill Machinery Co., Montreal, Que.
H. W. Petrie, Ltd. - - Toronto, Ont.

SIDNEY for SERVICE

The Sidney Tool Company
SIDNEY, OHIO, U.S.A.

If any advertisement interests you, tear it out now and write with letter to be answered.



The demand for greater production was met and surpassed by the Becker High Power Vertical Millers, and by virtue of the distinct features they possess. Their superiority over other millers is very pronounced.

The fourteen types and twenty-four sizes from which to choose is one evidence of efficiency. The individual features evident from the illustration are but an inkling of the features constructed *in* the machines that have gone to stamp the Becker as superior.

Your inquiry is sure of receiving prompt and satisfactory attention.

Becker Milling Machine Company
HYDE PARK, BOSTON, MASS., U.S.A.

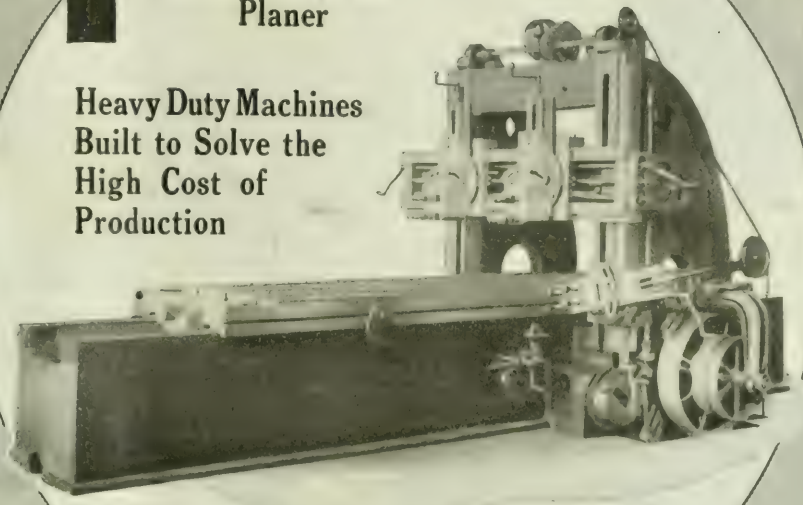
Agents:
THE A. R. WILLIAMS MACHINERY CO., LIMITED
Toronto and Hamilton
Williams & Wilson, Ltd., Montreal, Que.

HAMILTON

PLANERS

Hamilton 36" x 36" Planer

Heavy Duty Machines Built to Solve the High Cost of Production



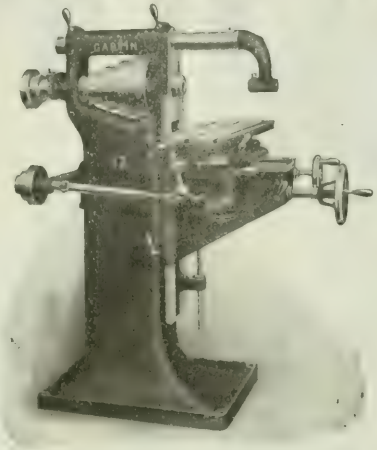
WEIGHT, RIGIDITY, DIMENSIONS and POWER—these are the combination of assets that give exceptional productive ability to "HAMILTON" PLANERS.
The installation of the "HAMILTON" strikes a crushing blow at the High Cost of Production. They do big work fast and accurately. Sizes from 24 x 24 to 54 x 54

Our bulletin will tell you all about this planer. Give us your address

The Hamilton Machine Tool Company, Hamilton, Ohio

H. W. PETRIE, LIMITED, TORONTO, Sole Agents for Ontario.

GARVIN



No. 12 Plain Milling Machine—Use Code Abrade

NO. 12 PLAIN MILLING MACHINE

FOR ALL LIGHT MANUFACTURING

This machine is built especially strong and substantial for a tool of its capacity, and has many valuable features worthy of special mention. The slide is fitted with a quick pitch screw, giving one inch per turn. This combines the rapidity of a rack feed with the steadiness of the screw feed. The table has an oil pan all around it, with finished edges—automatic feed, trip and reverse—adjustable nut on the feed screw to take wear—the Feed Screw is hardened.

Adjustments.....18 x 6 x 15 in.

For Further Information { ASK YOUR DEALER or WRITE US DIRECT

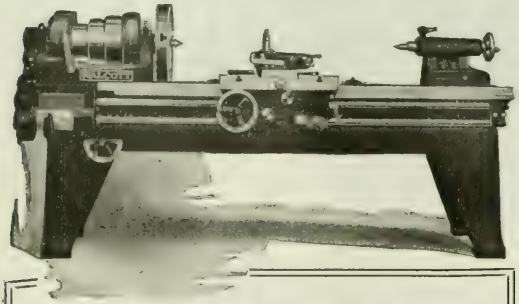
IMMEDIATE DELIVERIES

Send for Complete Catalog

Manufactured by

THE GARVIN MACHINE COMPANY

Spring and Varick Streets (*Visitors Welcome*) 50 Years New York City



THE WALCOTT LATHE

is backed by lathe-building experience extending over 35 years

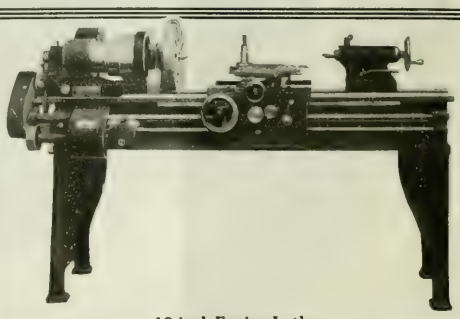
These are features of Walcott Lathes: drop-forged gears in apron; all-steel gears in gear-box; large ways on bed, all gears completely enclosed. Parts are interchangeable. Rigid headstock and tailstock.

You'll get the full story in our printed matter. Send for it surely if you are about to buy a lathe.

WALCOTT LATHE COMPANY

Successors to

Walcott & Wood Machine Tool Co., Calhoun St., Jackson, Michigan



13-inch Engine Lathe

The Filsmith Way

This is one way to make a short-cut to greater production and economic operation. With a 13¼" swing and 18 spindle speeds it will take in a great range and variety of work. Guaranteed material and workmanship are two expressions of our confidence in this machine. Write us and let us send you full specifications and information.

THE PHILIP SMITH MFG. CO.

Sidney, Ohio, U.S.A.

Mention this paper when writing advertisers. It will identify the proposition about which you require information.

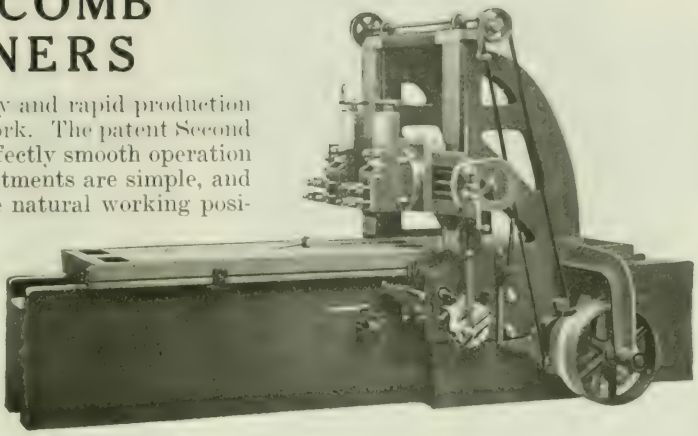
Powerful, Sturdy and Productive

The ability to run without shock or injurious vibration under heavy driving has placed

WHITCOMB PLANERS

in the lead for accuracy and rapid production over a wide range of work. The patent Second Belt Drive insures perfectly smooth operation at all times. All adjustments are simple, and quickly made from the natural working position of the operator.

WRITE FOR CATALOG



Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass. *Engine Lathes Metal Planers*

KEMPSMITH

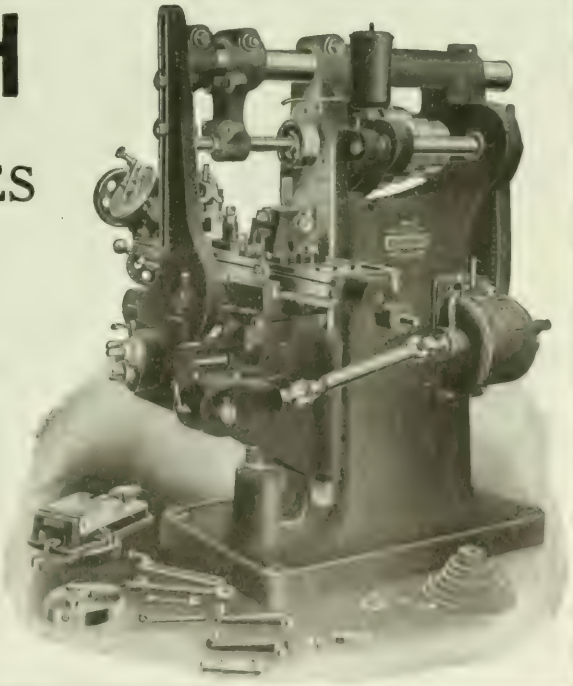
UNIVERSAL MILLING MACHINES

Every Kempsmith Milling Machine of whatever size, is provided with a slotted spindle nose for positive drive of arbor and for positive drive of face milling cutter in either direction.

Every machine is equipped with our patented keyed overhanging arm which insures positive alignment of arbor and boring bar and also prevents the cutter being pounded out of line under cut.

Kempsmith machines are heavy, with weight well distributed and their accuracy is guaranteed within very close limits.

Send for Illustrated Catalogue.



Kempsmith Manufacturing Co.
MILWAUKEE, WIS., U.S.A.

AGENTS:
Foss & Hill Machinery Co., Montreal.
General Supply Company, Toronto and Ottawa.
Canadian Western Foundry & Supply Co., Calgary, Alta.

If any advertisement interests you, tea[illegible]

A time saver
Can you beat it?

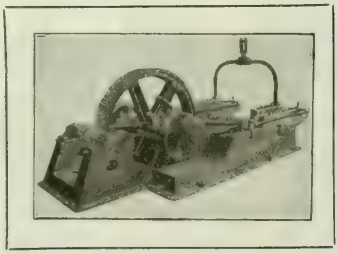
HAVE you noticed the Consolidated Clamp Connection on all Consolidated Presses grips like a vise and stays put, one of the bull-dog kind, which, when properly tightened, will not break away, or slip?

If you break it we will furnish a new one free of charge.

Consolidated Press Company

HASTINGS *LARGEST EXCLUSIVE MANUFACTURERS OF POWER PRESSES IN U.S.A.* MICHIGAN

Canadian Representatives: A. R. WILLIAMS MACHINERY CO., Limited, Toronto, St. John, Winnipeg, Vancouver



ELMES

18" Stroke Hydraulic Pump

for maximum pressures and capacities, for 250 horse-power motor—a pump designed to meet the demand for a high-pressure outfit of large capacity, and one able to withstand the severe usage of present-day practice.

Other designs for all pressures and capacities.

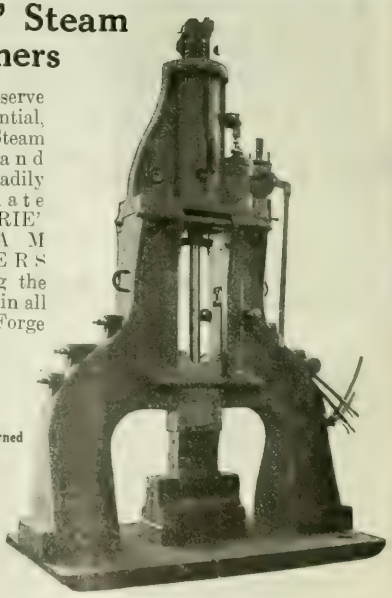
Charles F. Elmes Engineering Works

217 No. Morgan Street CHICAGO, ILL.

"Erie" Steam Hammers

Closely observe this substantial, well built Steam Hammer and you will readily appreciate why "ERIE" STEAM HAMMERS are getting the preference in all modern Forge Shops.

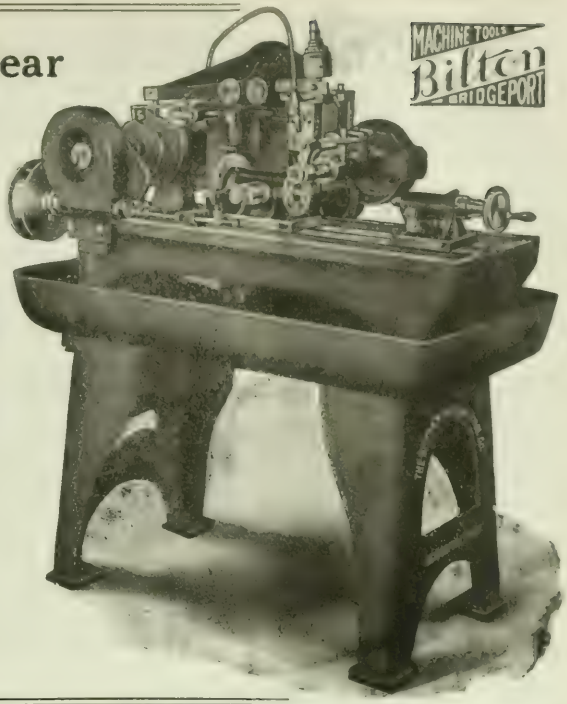
They have earned their enviable reputation.



ERIE FOUNDRY COMPANY

ERIE, PA. U. S. A.

Bilton Automatic Gear Millers—Spur or Bevel Gears



CAPACITY

No. 1 - - 14 Pitch
No. 2 - - 10 Pitch
No. 3 - - 8 Pitch

The Bilton Machine Tool Company

Succeeding The Standard Mfg. Company

Housatonic Ave., Bridgeport, Conn., U.S.A.

Also Manufacturers of—
Plain Horizontal Millers
Automatic Millers
Plain and Ball Bearing
Bench and Column Drills
Milling Cutters
Riveting Machines

Catalog 30 on request

Foreign Agents:
Alfred Herbert, Limited
M. Mett Engineering Company
Chas. Churchill Company, Limited

Banding 6" to 12" Shells

Its sturdy construction allows it to stand up under severe service. This is the reason for its higher price. Such extra care, better material and expert workmanship are required that the results warrant the back cost.

It has six 11" semi-steel cams which move 4½" or more if necessary. All cams returned by levers on plates with heavy Vanadium Steel Springs. Cylinder removable of alloy steel.

Hydraulic inlet to cylinder 1½ pipe. Distributing ring 2". All pipe of Seamless Steel Tubing. All fittings dropped forged steel. All parts under strain semi-steel castings and forgings.

Six dies of forged chrome nickel steel hardened and removable without disturbing any part of press by loosening two nuts. Can be operated either from accumulator or pump.

Built also in smaller size of same type for banding "pounder" to 6" shells.

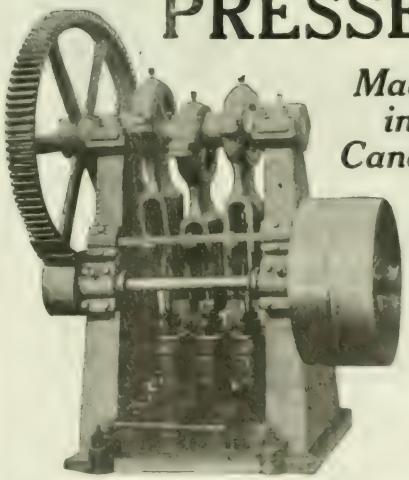
Metalwood Manufacturing Co.

Leib and Wight Sts. -:- DETROIT, MICH.

For Great Britain and Continent, address Gaston E. Marbaix, Coronation House, 4 Lloyds Ave., London, E.C., England.

PRESSES

Made in Canada



Hydraulic Presses, Pumps and Accumulators for all purposes

WRITE FOR PRICES AND DELIVERIES

WILLIAM R. PERRIN, Limited

TORONTO, CANADA

If any advertisement interests you, tear it out now and place with letters to be answered.

STEEL LETTERING DIES AND STAMPS

MATTHEWS HAND - MADE STEEL LETTERS. Strictly hand-cut from best tool steel. Furnished individually or in complete sets. Nothing better made in this class of steel stamp.

A product worth marking is worth marking right.

The well-known products of leading manufacturers are stamped with

Matthews Steel Dies and Stamps.

No other form of advertising costs so little.

MATTHEWS "CHAMPION" STEEL TYPE and HOLDER. For rapid, interchangeable marking by hand.

Write for a copy of this catalog. It illustrates the different kind of steel lettering, dies and stamps we are shipping to all parts of the world.

We operate the largest and most modernly equipped shop in the United States for making all classes of steel lettering, dies and stamps.

ESTABLISHED 1850

JAS. H. MATTHEWS & CO.

MARKING DEVICES

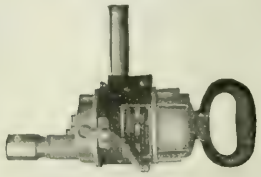
PITTSBURGH - - - PA., U.S.A.

THE CANADIAN FAIRBANKS-MORSE CO., LIMITED

Montreal, Toronto, Quebec, Ottawa, St. John, N.B., Winnipeg, Calgary, Saskatoon, Vancouver, Victoria.

U. S. Electric Drills and Grinders

Save Time, Labor and Money



They can be attached to any lamp socket.

For drilling in metal they are superior to any other kind of portable drill. Cost 50% less to run than air drills.

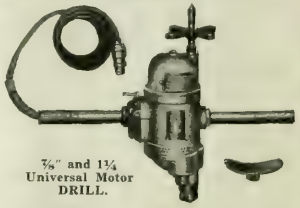
3 SIZES

3-16 in., W.G.T., 6 lbs.
¼ in., W.G.T. 9 lbs
⅜ in., W.G.T. 12 lbs.

All motors wound for 110 or 220 volts.

Direct or alternating current.

Try a few of our E'ectric Drills and Grinders and you'll send us an order for more. Our guarantee protects you.



¾" and 1¼ Universal Motor DRILL.

For Sale By

The Canadian Fairbanks-Morse Co., Limited

Montreal, St. John, N.B., Toronto, Winnipeg, Calgary, Vancouver

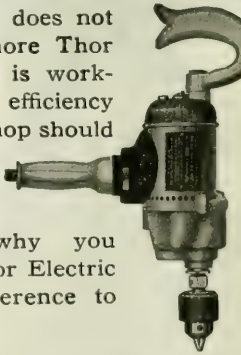
THE UNITED STATES ELECTRICAL TOOL CO.

CINCINNATI, OHIO

Thor UNIVERSAL Electric Drills

Licensed Under Burke Universal Motor Patent

No shop which does not use one or more Thor Electric Drills is working to full efficiency which every shop should do during these critical times. Let us demonstrate why you should use Thor Electric Tools in preference to other makes.



Independent Pneumatic Tool Company

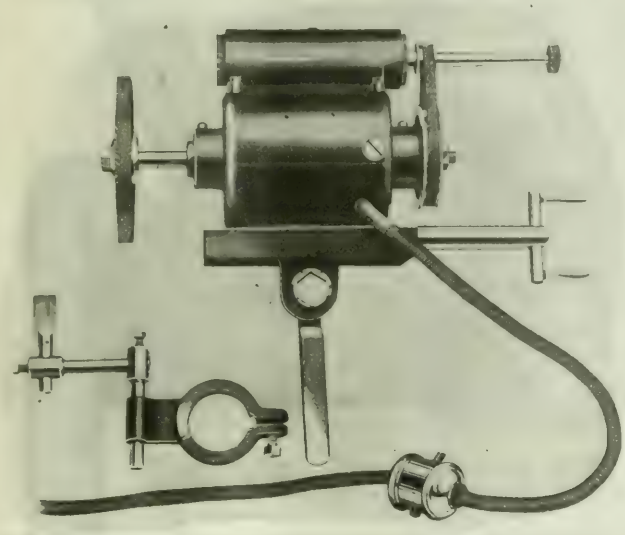
Office: 334 St. James Street, MONTREAL, QUE.

Toronto: 32 Front St. W; Winnipeg: 123 Bannatyne Ave., E; Vancouver: 1142 Homer Street

What do you think of this for speed?

Portable Electric Grinder

ARO **30,000** Revolutions Per Minute



Like all other operations cost of grinding, on account of the war, is hitting the high spots. But you would never know it if you put in an ARO Grinder. Has no equal for rapid production and it turns out work in perfect shape. Its ideal construction will convince you of these facts. Armature, internal spindle, pulleys and large emery wheels dynamically balanced. Motor and internal spindle equipped with S.K.F. ball bearings. No end thrust, no side play, no vibration.

Handles all kinds of grinding jobs—internal, external, longitudinal, cylindrical, etc.

Think of its speed, 30 000 R.P.M. That ought to cut your grinding costs.

Write for full details.

R. E. T. Pringle, Ltd.

Manufacturers' Agents

OFFICES:

Tyrrell Bldg. 95 King St. East, TORONTO
809 Unity Bldg., - - Montreal, Que.
3402 Osler Ave. - - Vancouver, B.C.
302 Donalda Block - - Winnipeg, Man.

May We Repeat

THAT

P H

TRADE MARK

QUALITY FILES

are the only files made in Canada using BEST CRUCIBLE CAST STEEL exclusively in their manufacture. What does that mean to the user?

IT MEANS a keener cutting edge to the teeth, and longer life to the file. IT MEANS the stock has that "pep" in it so beloved of metal workers. IT MEANS that after a long and honorable career on the bench, there is still fine steel in the file which warrants the user in having it re-cut and put on the job again on less "fussy" work.

THAT IS TRUE ECONOMY.

Port Hope File Mfg. Co., Limited

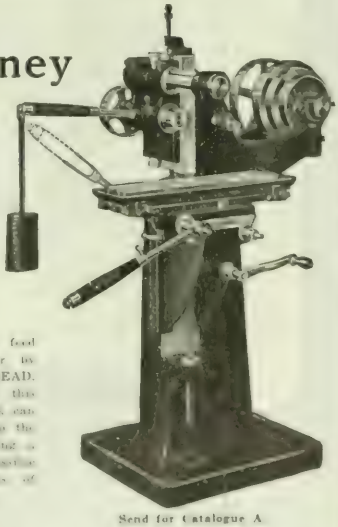
Port Hope, Ont.

"Ask your jobber"

THOUSANDS IN USE

The Whitney

Hand (Feed) Milling Machine



The vertical feed is provided for by the SLIDING HEAD. On account of this feature the work can be held close to the table, thus giving a rigidity not possible on other types of Hand Millers.

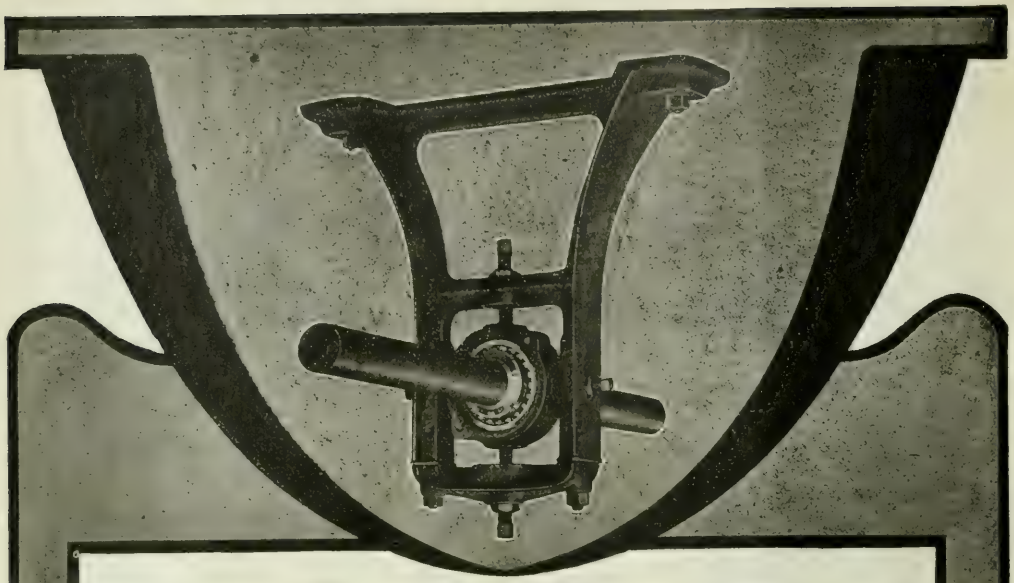
Send for Catalogue A

The Whitney Mfg. Co.

Hartford Conn. U.S.A.

Chains—Keys—Hand Milling Machines.

If any advertisement interests you, tear it out now and write on it what you want to remember.



When You Buy SKF Ball Bearing Hangers

you also buy satisfaction—the satisfaction of real service.

To know that shutdowns and hot bearings are a thing of the past, to wipe out all transmission troubles at one stroke—that is part of the satisfaction SKF Hangers give.

If you do not know this satisfaction, if you are still using the old type plain bearing, then you should investigate SKF Ball Bearings. Learn how others save time, trouble and money by SKF transmission equipment.

You can learn this, without obligation by sending for our Hanger Bulletin.

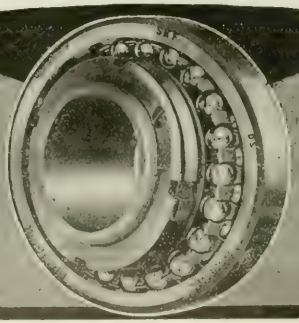
CANADIAN SKF COMPANY, LIMITED

47 King Street West, Toronto, Ont.

Sole Canadian Agents for SKF Transmission Bearings:

THE CANADIAN FAIRBANKS-MORSE COMPANY, LIMITED

St. John Quebec Montreal Ottawa Toronto Hamilton
Windsor Winnipeg Saskatoon Calgary Vancouver Victoria



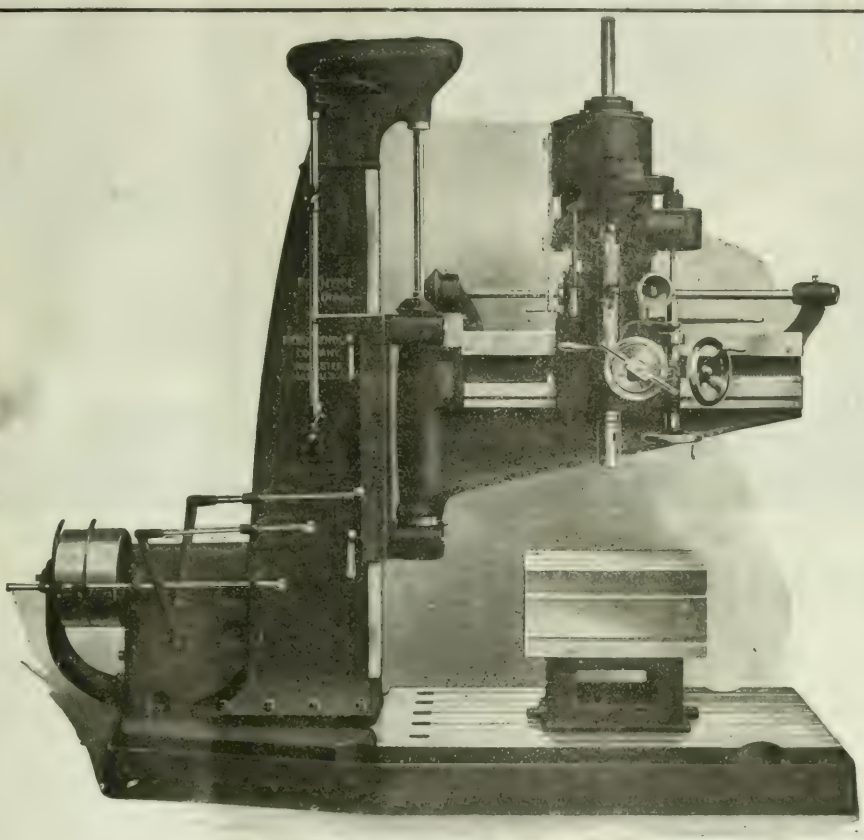
SKF

Self-Aligning Ball Bearing Hangers

REED-PRENTICE COMPANY

R-P

WORCESTER MASS. U.S.A.



THE FIRST CHANCE YOU HAVE

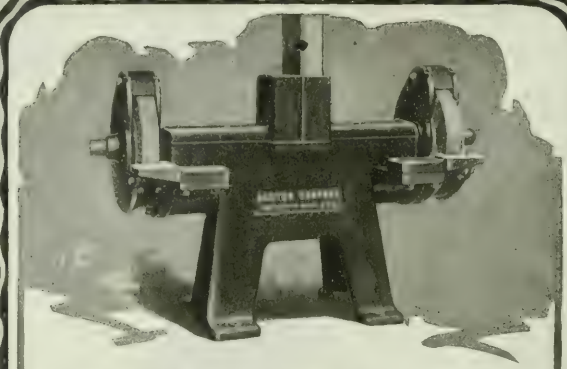
to watch REED-PRENTICE RADIAL DRILLS at work, stop for just a few minutes and study them. It is likely you will have this opportunity since they are used in all parts of the world.

You can then understand why they are so unfailingly satisfactory. The spirally cut gears flow the power through to the spindle without noise or chatter. The convenience of all operating levers, the many speeds and feeds, and the imposing solidness of the design will suggest to you the worthiness of a REED-PRENTICE for your work.

Send us your name and address and we will gladly send you the catalogue on Light and Heavy Duty Radials.

CANADIAN FAIRBANKS-MORSE COMPANY, LIMITED

If any advertisement interests you, tear it out now and place with letters to be answered



NOTE the sturdy construction of this NORTON grinding wheel stand the large spindle bearings the strong protection hoods—the exhaust connections for carrying away the dust and chips—the strong "roomy" work rests—the abundance of foot space—all of which enable the operator to handle heavy work economically and without extra strain.

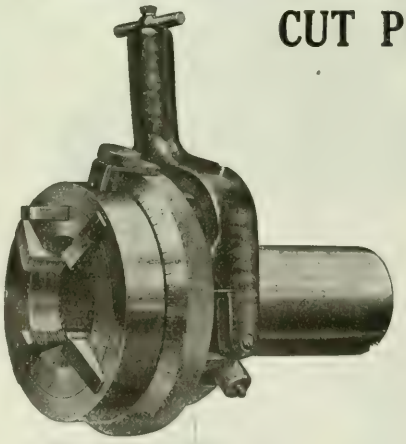
Note also the absence of sharp corners and projecting parts, and recesses where dust might lodge.

Let us send you our Bulletin on Grinding Wheel Stands and Protection Hoods.

NORTON

NORTON COMPANY
WORCESTER, MASS.
NEW YORK STORE:
151 Chambers Street
CHICAGO STORE:
11 N. Jefferson Street

WELLS SELF-OPENING DIES
CUT PERFECT SCREW THREADS



WELLS SELF-OPENING DIE
has both face and hand trip.

The Wells Self-Opening Die cuts the thread with a fine shearing cut, then opens with a quick, positive snap.

Adaptability

The Wells Self-Opening Die can be used on screw machines, lathes, automatics, drill presses and bolt cutters.

Chaser Principle

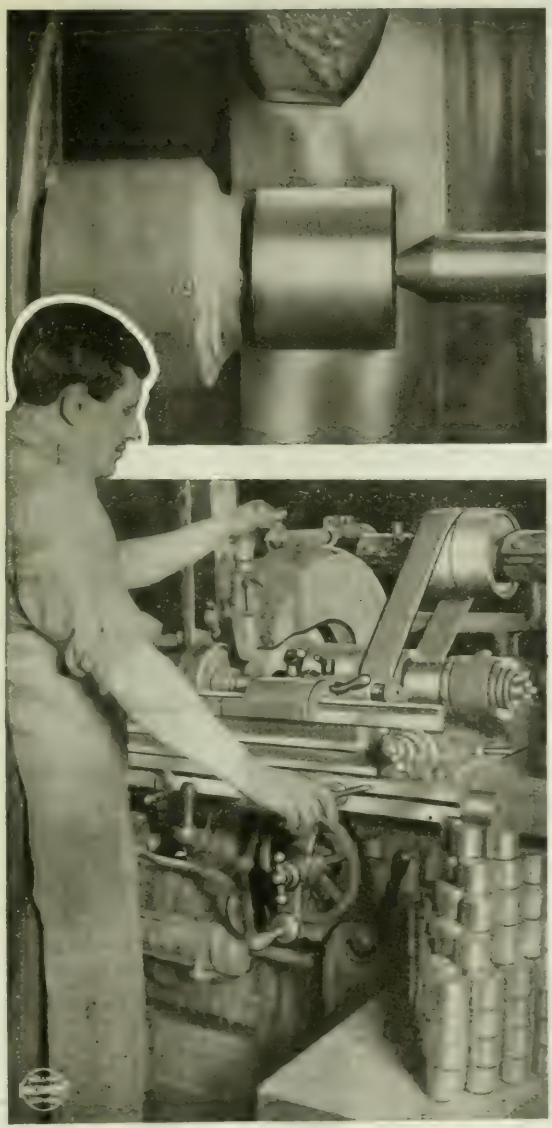
The Wells Self-Opening Die embodies an entirely new principle of design. The chasers are about four times as long as the threaded portions and are supported throughout their entire length and width by the solid sides of the slots in the body. They cannot squirm away from the work. Wear is reduced to a minimum throughout. Adjustment is simple, positive and accurate.

A large number of these Dies in stock for Immediate Shipment.

Wells Brothers Company of Canada, Limited
GALT, ONTARIO

Sales Agents: The Canadian Fairbanks-Morse Company, Limited, Montreal, Toronto, Vancouver, Winnipeg, St. John, Calgary

NORTON GRINDING



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This Norton Grinding Machine is used almost exclusively for grinding steel rolls for railway roller bearings—the rolls are 1¾" diameter by 1¼" long, are carried on centers and driven by a pin that engages a hole in one end. From 0.016" to 0.018" of hardened steel is removed from each roll and twenty pieces are ground at each truing of the grinding wheel. The table is not traversed, the wheel being fed straight into the work.

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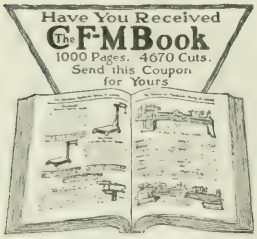

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Electric Steel Furnace Development and Services

By E. Kilburn Scott

In view of the rapidly increasing demand for high grade steels, attention has been forcibly directed to the service which the electric furnace renders in their production. War-stimulated development has nowhere been more marked than in this type equipment, and not a little insight into the progress made and the achievement compassed is made available in the detail of the article with its accompanying illustrations that follows.

ONE of the most striking developments of the steel industry of Great Britain, arising from the war, has been the rapid increase in number of electric steel furnaces, and so successful have they been that the prejudice against them is rapidly disappearing, and the change will probably rank as the most radical one since the time of Bessemer. Amongst factors which have helped to bring the electric furnace into favor are the following:

Electric Furnace Factors

(a)—The war demand for special tool steel for tools, dies, gauges, etc.

(b)—The demand for chrome and other special alloy steels for aircraft tubing, rustless steel, etc.

(c)—The difficulty in obtaining bles, and the Bessemer and open-hearth furnaces:

(1)—The charge is not in contact with the products of combustion of carbonaceous fuel.

(2)—The charge is under the absolute control of the operator; the conditions can be made oxidizing, neutral or reducing, as required.

(3)—The melting loss is an absolute minimum as compared with 7 to 15 per cent. in other processes.

(4)—The charge can be made up entirely of very cheap base material such as turnings, borings, millings, light scrap or large rough scrap, and can be easily melted and refined to a steel low in impurities and of exceptional quality.

(5)—The temperature can be controll- percentage of carbon and even carbon-free can be produced.

High Quality Steel Castings

For the manufacture of high quality steel castings, the electric furnace is ideal. The superiority of electric steel castings over those made by any other process has been conclusively proved by the extremely severe conditions to which these castings have been subjected under specialized war conditions. The castings produced can be finished off dead mild and a one inch square bar can be bent double as cast, no expensive annealing operations being necessary. The carbon contents usually vary between .2 per cent. and .25 per cent., while the sulphur and phosphorus are each reduced

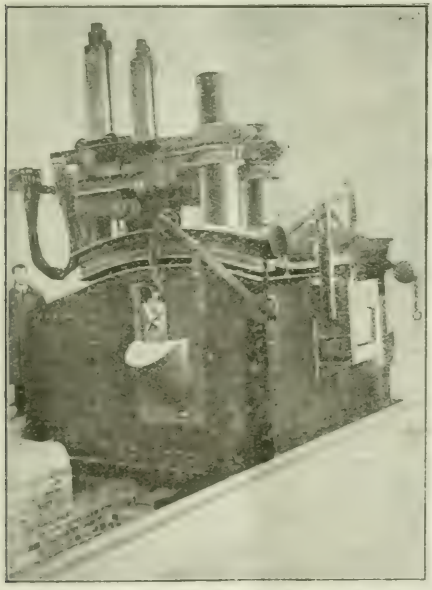


FIG. 1. THREE TON GREAVES ETCHELLS FURNACE

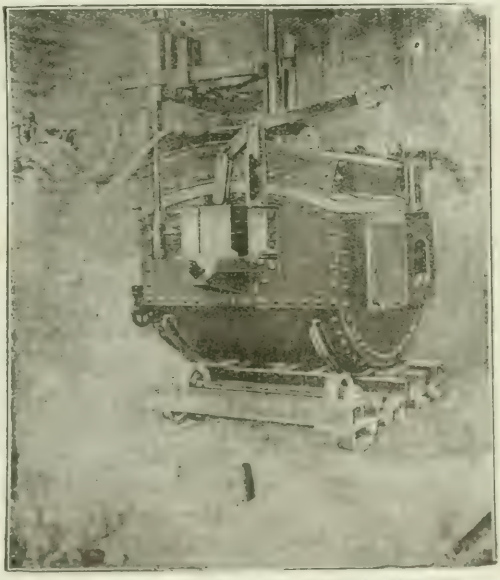


FIG. 2. HALE-TON GREAVES ETCHELLS FURNACE

Swedish iron, which besides being scarce, is extremely expensive.

(d)—The difficulty in obtaining skilled labor to work the crucible steel process.

(e)—The necessity of profitably using turnings, millings, ends of tubes, bars, and other scrap steel.

(f)—The ease with which high-class steel can be made from second grade materials in electric furnaces.

Advantages of Electric Steel Treatment

The following are some of the advantages of treating steel in electric furnaces over the older methods by crucible almost instantly over a very wide range, which allows a wider range of chemical refinement than is possible by other means.

(6)—Scrap containing valuable elements such as nickel, chromium, vanadium and tungsten can be melted without loss of these elements.

(7)—The steel produced is purer, more free from dissolved gases, slag fibre, etc., and therefore has much better physical properties than that produced by any other method.

(8)—Steels containing any desired below .015 per cent., and manganese and silicon are adjusted to suit the work. The tensile properties of ordinary electric cast steel are:

Maximum tensile strength, 37 tons per square inch.

Yield point, 25 tons per square inch.

Reduction of area 50 per cent.

Elongation, 30 per cent., while the maximum tensile strength may be readily increased to even 100 tons per square inch by the introduction of special elements such as nickel, chromium and tungsten.

Many plants that sell their steel swarf and scrap, cast iron borings, etc., at very

nominal prices and purchase all their steel castings, could very profitably install an electric furnace and make their own castings from the scrap.

Steel from the electric furnace is finished off under a reducing atmosphere of carbonic oxide and a slag out of which the metallic oxides have been reduced, and is singularly free from blowholes when properly cast. This is due to the elimination of the gases that molten steel usually holds in solution, and the ease with which the steel can be poured into small and intricate castings, flowing smoothly like milk and setting perfectly quietly in the moulds is largely due to its purity.

Small Light Castings

For small, light castings, furnaces of not more than 1½ tons are recommended. Steel of low carbon content has a high melting point and must be cast at a very high temperature, and though the temperature is easily obtainable in the furnace, difficulties occur in handling large quantities of such hot metal in ladels, if a large number of castings are to be made. For small mild steel castings—many of which have proved an excellent substitute for malleable iron castings—smaller furnaces are recommended and several firms have installed furnaces of ½-ton capacity to melt steel for small engine parts of motor cycles and motor cars instead of using stampings.

Where large quantities of good steel are required, "The Hot Metal Process," as it is called, combines cheapness and quality. It has been adopted very extensively in the United States. The metal is first heated in a basic lined tilting open hearth furnace of large capacity, and is then run into a number of electric furnaces for final refining and addition of alloys. The process is continuous, and as the energy for first melting of steel is obtained direct from fuel, the amount of electrical energy is only that required to maintain the temperature during refining and assimilating of the alloys. Steel so produced commands high prices.

Electric furnaces are used for the melting of ferro alloys for open hearth and Bessemer plants, as it is found much more economical to make alloy additions in the molten form.

Types of Furnaces.

As the earlier furnaces were for small outputs, single phase alternating current was used, and to obtain a balance on a multiphase supply, several furnaces had to be worked together. Multiphase furnaces are better than single phase furnaces, because for a given output of steel, one such furnace is cheaper, takes up less room, and requires less attention than several single phase furnaces. With single phase, if one arc fails, the circuit is broken and the load falls to zero. This is liable to happen during the melting down period when the pieces of scrap metal change position under the electrodes. Two distinct types of electric furnaces are used for steel manufacture.

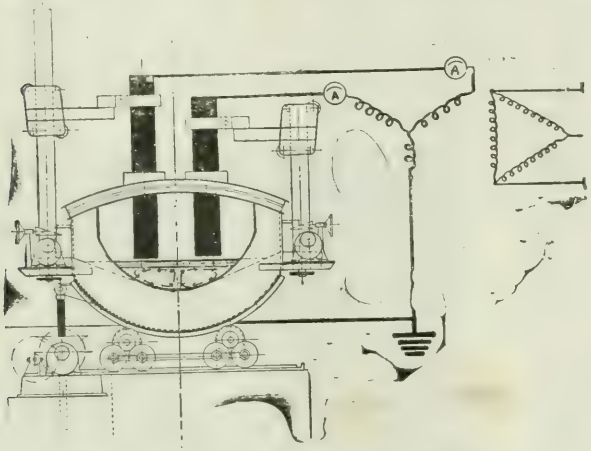


FIG. 3. SECTION THROUGH 6-TON FURNACE SHOWING CIRCULATION OF THE METAL AS IN BOTTOM HEATING.

First, there is the induction type, which acts on the principle of an alternating current transformer, the metal being melted by having very heavy currents induced in it by a single phase or three-phase supply. These furnaces are used to a considerable extent abroad.

Second, there is the arc type of furnace, which has electrodes of carbon or graphite, the metal being melted by arcs formed between the electrodes and the charge, or between the electrodes themselves. Arc furnaces may work with single phase or two or three phases. Some arc furnaces have all the electrodes above the bath of metal, one of this class being the Heroult. As arranged for three phase supply, it has three vertical electrodes through the roof and the arcs are between each electrode and the bath, so that the molten metal forms part of the electrical circuit.

Two furnaces, namely the Girod and the Snyder, employ water-cooled steel studs, which pass right through the bottom or hearth. As the ends of the studs project into the metal of the charge, they burn away and have to be renewed at intervals. There is danger of the metal finding its way through the hearth; and the liability of trouble with water connections.

It will be noted that in all the above-named furnaces the refractory material of the hearth does not require to carry current. The material may be therefore either acid (silica) or basic (magnesite).

The furnaces mentioned below have also bottom electrodes, but come under a different category because the hearth itself conducts electric current. It is, therefore, made of magnesite material as this, when heated, is a fairly good conductor. A furnace of this class is that of Electro-Metals Ltd., which was invented by Gronwall. It works with two phases and has two electrodes above the bath, whilst a third electrode below the hearth acts as a common neutral for the two phases.

Greaves-Etchells Furnace.

Another furnace which has met with considerable success is that of Greaves-Etchells, more than thirty having been installed or put under construction since January, 1916. As this is an all British production, both in inception and manufacture, a detailed description may be of interest. It is designed to operate on a three (or two) phase supply, and has two of the phases connected to electrodes above the bath, the third phase being connected to a copper plate below the electrically conductive hearth of magnesite.

The furnace body consists of a rectangular tank made of boiler plate riveted, and strengthened by angle sections. The bottom is dished and has two steel rails of vignoles section riveted to it. These rest on grooved steel rollers and the whole furnace, with its electrodes, etc., can be tilted backwards and forwards, by means of a screw and gear wheels. In the small furnace, the tilting is effected by a hand wheel and in the larger sizes by means of electric motor.

Each electrode is secured in a holder made of bronze or steel and each holder is attached to, but insulated from a steel jib, projecting from a wheeled carriage. The carriage travels up and down a vertical mast, which is made of two channel sections bolted on to the side of the body. In small furnaces, the electrodes are regulated by a hand wheel, and in large furnaces by a motor through single reduction gearing.

The roof is made of silica bricks, as these are fairly good insulators. They are set in a steel framing which rests on the silica brick walls projecting above the steel body of the furnace. The roof is domed and brought as low as possible so as to reduce the wasting away of the electrode by action of the gases. A roof will last about 100 heats and a duplicate one is provided with each furnace so that the steel melting can be carried on, except for the short time taken to change the roof. In order to obtain an even temperature through the bath of molten steel in the electric fur-

nace, it was realized that heat must be applied below as well as above the bath, and in order to effect this the hearth of the furnace is specially constructed.

Botton Heating Feature

Above 12 per cent. of the total energy of the Greaves-Etchells furnace is used in the hearth, and the "bottom heating" which results, is found to be of great advantage in melting down alloys. The heavier alloys, chrome, tungsten, vanadium and nickel, sink to the bottom of the bath, and if there is no bottom heating are apt to remain for a considerable time in a semi-fluid state. The hearth lining is never less than 20 inches thick, and is constructed mainly of dolomite and magnesite, in such a manner that the electrical resistance is high at the inside of the bath in proximity to the charge and decreases rapidly to a negligible quantity at the outside. The current flowing through the hearth generates a considerable amount of heat immediately below the liquid in the most efficient manner possible, while the electric arcs arranged over the bath maintain the slag and surface at the desired temperature.

The effect of this bottom heating is to cause convestion currents in the molten metal, which ensure a constant circulation and a uniform product. The outside of the furnace botom remains cold, little or no heat being lost in this direction. This system of connection at first sight would appear to cause an out of balance load on the primary supply, but the system of transformer ratios is arranged to give a perfect balance when the upper electrodes are in equal adjustment. The high tension electric supply is transformed by means of a delta-star system of connection to low tension, the transformer house being as near as possible to the furnace in order to avoid heavy copper costs and energy losses in the low tension connections.

Transformer Connections and Short Circuiting

The equipment has to be designed to withstand short circuiting of the electrodes, as this occurs in all furnaces during the melting process when pieces of metal fall against the electrodes. The method usually adopted by furnace builders to provide against this is the introduction of considerable reactance in the electrical system, but unfortunately this reduces considerably the energy available in the furnace. Besides increasing the energy losses, it is also very objectionable to the supply authorities.

The Greaves-Etchells system of transformer connections is such that the short circuit current of one electrode must traverse two transformers in series and in different phase, which automatically lowers the power factor momentarily, and has a very strong buffer effect. The fact that there is always a permanent resistance in the path of the current through the hearth also limits very considerably the effects of short circuits. The combination of these factors provides the most effective means yet devised for protecting the supply system from shock, while allowing a high power factor to be obtained on normal load.

In all electric steel furnaces the metal is poured by tilting the furnace, and when this is effected by mounting the furnace on rockers, the end of the spout not only moves downwards, but also away from the ladle. Clearly the only way to keep the spout in one position would be to rotate the furnace round it, but this is out of the question because it would mean lifting the furnace bodily and take too much power. A 10-ton furnace, for example, may weigh as much as 90 tons.

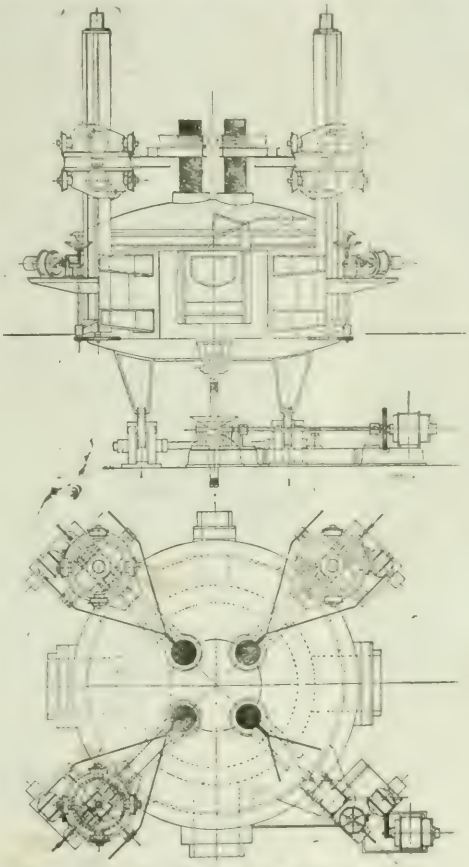


FIG. 1. PLAN AND ELEVATION OF 10-TON FURNACE

The makers of the Greaves-Etchells furnace have compromised by arranging for the spout to descend in a vertical line so that the furnaceman and craneman have merely to see that the ladle is lowered whilst the metal is running out. This is effected by the system of compensating rollers shown in Fig. 3. The furnace is carried on two sets of rollers, and as it is tilted, it causes the top rollers to rotate the bottom rollers, and this moves the furnace bodily forward. The wheels are so proportioned that the movement forward is just the right amount to keep the end of the spout vertical as it descends. Greaves-Etchells furnaces are made in the following sizes:

Charge.	Kilo-volt Amperes	No. of top Electrodes	Diameter of Graphite Electrodes
½ ton	200	2	4"
1½ ton	320	2	7"
3 ton	800	2	8"
6 ton	1800	4	8"
9 ton	2000	4	9"
12 ton	2600	4	10"

High Speed or Special Alloy Steels

For the manufacture of high-speed steels or special alloy steels, a ½-ton or 1½-ton furnace is usually adopted, and the former can finish a charge from cold material and alloys in 2 to 2½ hours, with an energy consumption of 400 units.

To make up a charge from scrap, it is usual to place steel turnings and millings on the hearth, then pieces of bar and rail ends, tube ends, and finally large pieces of steel. The interstices between the large pieces are filled with turnings, etc., and some ore may be added. The amount of iron ore depends on the amount of iron oxide present in the form of rust on the scrap.

As the charge is melted, a slag of lime and fluorspar is made in order to eliminate the phosphorus as phosphate of lime. After this phosphate slag has been skimmed off, a new slag is made of best Buxton lime, fluorspar and white sand in the proportions of 30, 10, and 5. When this has fluxed, a small quantity of finely-powdered anthracite coal is spread on the slag, and this is continued until the slag is deoxidized. The steel is thus finished off under an atmosphere of carbonic oxide and a slag, out of which the metallic oxides have been reduced. When entirely deoxidized, a sample of slag falls to a fine white powder as it cools. Deoxidization of the steel, through the constant reduction of silicon from the slag, and it may be hastened by addition of small quantities of ferro silicon.

Comparison With Crucible Melting

As a comparison with the crucible steel process, it may safely be stated that a ½-ton electric furnace runs out a charge every 2½ hours, or, say, 9

charges per day, will do as much as 36 crucible furnace holes, each having two 56-lb. pots. The electric furnace is operated by one skilled man, one unskilled man, and one ammeter boy, whereas the crucibles require 15 men, most of whom are skilled, or at any rate classed as indispensable. At two Sheffield works, girls are employed to regulate the electrodes.

Such an electric furnace with its transformers and switch gear will occupy about a quarter of the space occupied by the crucible plant, and the initial cost of the electric furnace will be about half of that of the crucible plant. The charge of the electric furnace can be made entirely from turnings, millings, etc., whereas in the crucible steel process only a very limited quantity of turnings, etc., can be used.

Owing to the low heat efficiency and high cost of labor, crucible steel is much more expensive to manufacture. The cost of renewing crucibles is considerably higher than the renewal of an electric furnace for the same output. Already several steel works have shut down their crucible plant since installing electric furnaces.

The introduction of the Bessemer and open-hearth processes of making steel left crucible steel-makers indifferent owing to the fact that these methods were employed for making ordinary kinds of steel in great quantity for structures, rails, etc. The coming of the electric furnace is a different proposition, as it competes directly and successfully in the special field that the crucible steel process has held so long.

The crucible steel process has been largely responsible for great waste of the nation's resource by reason of the coke having to be made in the Beehive ovens, this quality coke being necessary for the crucible steel process. The introduction of the electric furnace should help to stop this waste in the future. It may be mentioned that very soon there will be 50 electric furnaces at work in the Sheffield district of England, and the output of steel from them will be at the rate of over 200,000 tons per annum. In the United States over 100 electric furnaces are already at work and a single electric steel plant is being erected in South Chicago, which will give an output of 200,000 tons per annum.

THREE YEARS WAR EFFECT ON PRICES

THREE years of war have given a lift to iron and steel prices such as is comparable to no other period in history, says The Iron Trade Review. Full appreciation of the remarkable rise in that period may be grasped only when the market quotations of Aug. 1, 1914, in principal products are measured against those which prevail to-day. This spread in pig iron has amounted to from approximately $37 to $41.50; in semi-finished steel, from $75.75 to $81; in finished rolled steel, from $10 in steel rails to $188 in plates and to approximately $200 in tin plates; and in old material from about $19 to $36.25 per ton.

These advances show that practically all products have been increased in value manyfold. The gross rise has been fairly uniform in different grades of pig iron, semi-finished steel and old materials. In pig iron advances have amounted to practically 250 to 345 per cent.; in billets and sheet bars about 525 per cent.; in wire rods about 400 per cent.; and in heavy melting steel about 210 to 235 per cent. In finished material, however, wide irregularities have been displayed. Here the three year's changes range from $10 per ton or 33 1-3 per cent in rails, a practically closed market, to 800 per cent. in steel plates. Wire products have gone up $49, while wire rods have ascended $75.25. Other important advances are

	1914	1915	1916	1917
PIG IRON.				
Bessemer, Pittsburgh	$14 90	$15.20	$ 21.95	$ 56.95
Basic, Pittsburgh	13 90	14.45	18.95	53.95
Basic, Eastern Pennsylvania	14 00	14.25	19.00	51.00
No. 2 Northern, Chicago	14.00	13.25	19.00	55.00
No. 2X, Philadelphia	14.60	14.50	20.00	54.00
No. 2X, Virginia	12.50	12.50	18.50	52.00
No. 2, Birmingham	13.50	10.50	14.00	47.00
Malleable, Buffalo	13.00	13.00	18.75	55.00
Ferromanganese	38 00	98.00	170.00	400.00
COKE.				
Furnace Coke, Connellsville, Contract	1 85	1.75	2.40	10.00
Foundry Coke, Connellsville	2.40	2.25	3.15	12.50
SEMI-FINISHED.				
Bessemer Billets, Pittsburgh	19.00	22.00	43.00	100.00
Open-hearth Billets, Pittsburgh	19.00	24.00	43.00	100.00
Bessemer Sheet Bars, Pittsburgh	20.00	21.70	43.00	105.00
Open-hearth Sheet Bars, Pittsburgh	20.00	25.00	43.00	105.00
Wire Rods, Pittsburgh	24.75	26.00	60.00	100.00
FINISHED MATERIAL.				
Tank Plates, Pittsburgh	1.10c	1.30c	2.90c	9.00c
Tank Plates, Philadelphia	1.25c	1.35c	3.00c	10.15c
Structural Shapes, Pittsburgh	1.15c	1.30c	2.50c	4.50c
Steel Bars, Pittsburgh	1.17c	1.30c	2.60c	4.00c
Iron Bars, Chicago	1.05c	1.20c	2.35c	4.50c
Tin Plate, Pittsburgh, per box	$ 3.25	$ 3.15	$ 6 00	$ 13 00
Sheets, No. 28 Black, Pittsburgh	1.80c	1.75c	2.95c	9.00c
Sheets, No. 28 Galvanized Pittsburgh	2.75c	4.25c	4.30c	10.25c
Sheets, No. 10 Blue Annealed, Pittsburgh	1.35c	1.35c	3.00c	8.50c
Wire Nails, Pittsburgh	1.55c	1.60c	2.50c	4.00c
Open-hearth Steel Rails, mill	$30.00	$30.00	$ 35.00	$ 40.00
OLD MATERIAL.				
Heavy Melting Steel, Pittsburgh	11 50	12.00	16.00	36.00
Heavy Melting Steel, Eastern Pennsylvania	10.50	12.50	15.00	35.00
Heavy Melting Steel, Chicago	9.50	11.50	14.25	33.50
No. 1 Railroad Wrought, Eastern Pennsylvania	12.00	13.50	19.75	38.75
No. 1 Railroad Wrought, Chicago	9.00	9.00	14.50	36.75
No. 1 Heavy Cast, Eastern Pennsylvania	12.25	12.50	16.25	35.00
No. 1 Cast, Chicago (net ton)	9.75	9.25	12.25	28.50

630 per cent. in No. 10 blue annealed sheets; 500 per cent. in No. 28 black; 260 per cent. in No. 28 galvanized; 400 per cent. in structural shapes; 430 per cent. in steel and iron bars; about 400 per cent. in tin plate and about 260 per cent. in wire nails. The rise in furnace coke has amounted to about 450 per cent. Spot coke at its recent high point, however, was about 840 per cent. above the Aug. 1, 1914, price.

Studying the price evolutions of the past three years, the large part of the advance that has taken place during the past year is striking. It is set forth that fully two-thirds of the total uplift of the market since Aug. 1, 1914, came during the past 12 months. Apparently the cumulative effect of the previous heavy buying then expressed itself. This appears to hold true with substantial uniformity in practically all products. There is, perhaps, some relation between this fact and the general shortage in ingot capacity which made all products similarly scarce.

In 1914 the iron and steel industry produced approximately 23,300,000 tons of pig iron and 18,370,000 tons of finished steel. Prices then were the lowest in several years. To-day with the highest prices by a wide margin ever known, production is running at the rate of about 38,300,000 tons of pig iron, about 45,000,000 tons of ingots, and perhaps 33,000,000 tons of finished steel. The extraordinary expansion of the total monetary turnover is illustrated by this comparison. The tremendous additions to credit accommodation and the general hazard in doing business to-day also are emphasized. At present it is necessary to extend to individual customers a line of credit far beyond that prescribed by good business standards in ordinary times. Without this, however, these buyers would not be able to conduct full operations since it requires a very much greater outlay to purchase a normal quantity of raw material.

Has the crest of prices now been reached? If supply and demand are left to themselves, the answer probably will be in the negative. Demand continues apparently much in excess of supply. The government or rather its attitude toward the market, however, now represents the principal price factor, sentimental or actual. A condition radically different from anything during the past three years now exists and this must be taken into full account in gauging the future of the market.

PRODUCTION METHODS AND DEVICES

A Department for the Interchange and Distribution of Shop and Office Data and Ideas Evolved from Actual Practical Application and Experience

THREAD CUTTING ON THE LATHE

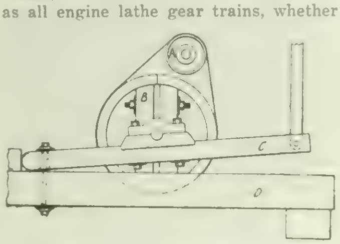
By R. Hamilton.

OWING to the fact—fortunate or otherwise, that many plants are still equipped with a number of old makes of engine lathes, it is still the duty of mechanics to figure out their own gearing for every different thread to be cut; and while in some respects such a circumstance is not conducive to economic operation of machine tools the modern method undoubtedly has a marked tendency to deteriorate the constructive abilities of the average workman. It is well known that many a good mechanic to-day can cut a very accurate thread on a modern engine lathe, fitted with the improved system of rapid change gears, and yet the same man might be unable to calculate the train of gears necessary to cut any particular pitch of thread. The changes that have taken place in the development and improvement of metal working machinery have been of inestimable value when considered from a production standpoint, but the semi-automatic character of up-to-date machine shop equipment has done much to reduce the standard of the old-time mechanic, where his thinking cap was more often used than it is at the present time; not that the opportunities for demonstrating his individual initiative have become less with the advanced state of science, but the adoption of the graduated dial, the simple movement of levers for changing gears, special fixtures and jigs for holding work, and numerous other contrivances of the modern shop, have almost eliminated the necessity for him to use and develop his mental faculties along those lines that would otherwise keep him posted on some of the elementary yet fundamental essentials of his particular calling.

Under the modern method of cutting threads with the single point tool, the operator has only to move one or more levers to indicated positions in order to set the lathe to cut the desired thread. In performing these simple movements he has accomplished in a few seconds what formerly took several minutes and often much figuring. While the man of to-day attains his purpose without any apparent mental effort, it was imperative that the operator on the old style engine lathe should figure out and assemble each train of gears required. Too much cannot be said of the advantages of the modern system of rapid change gearing; but these lathes, as thread-cutting machines, are invariably restricted to the cutting of threads within the range of the assembled gearing. The number and pitch of the various threads that can be cut are sufficient for all ordinary requirements, but there occasionally arises—especially in outlying jobbing shops, work that requires threads not covered by the changes available. Under such conditions it is necessary to dopt other methods, or take the work to a lathe where the change gears are not incorporated with the permanent mechanism.

Underlying Principles of Screw Cutting

Realizing these possibilities, it should be the duty of all machine operators to keep in touch with the principles involved in the calculations for determining the necessary gears to meet any thread cutting requirements. The first and all important factor in connection with screw cutting, using the single point tool, is that the carriage which supports the tool must have a traverse per spindle revolution, equal to the lead of the screw to be cut. To achieve this, it is obvious that the gears selected should be such, when correctly assembled, as to give a certain speed ratio between the producing and the produced thread. The pitch of the lead or producing screw is the basis of calculations, as all engine lathe gear trains, whether



INTERESTING REVERSING GEAR.

of the modern assembled or old demountable type, are determined and arranged to harmonize with the threads on the lead screw.

For instance: suppose we have to cut a screw having 14 threads per inch, the lead screw being 4 threads per inch. The ratio in this case would be 4 to 14, or 1 to 3½; that is, the lathe spindle must make 3½ revolutions while the lead screw is making one. This can only be accomplished by a similar ratio in the connecting gearing. The number of teeth in the gears selected—which is the general method of obtaining gears, is dependent on the wheels available on each lathe. Suppose then that the set starts with a pinion of 24 teeth and advances by four teeth for each succeeding gear. Using 24 as one of the required pair (simple gearing), the companion gear must bear the same relation to this as 1 does to 3½, or 24 multiplied by 3½ equals 84 teeth; this gear to be placed on the lead screw and the 24 tooth pinion on the lathe or stud spindle.

Again, suppose a screw of 27 threads per inch is to be cut on the same lathe as above. The ratio would be 4 to 27, or 1 to 6¾. Using the 24 tooth pinion on the spindle stud, the gear required for the lead screw (simple gearing), would be 24 multiplied by 6¾ equals 162 teeth. This, however, is beyond the range of available gears, so it is therefore necessary to calculate the gears and compound the train, by using a coupled pair on the intermediate stud. To obtain these required gears, select at random a gear, say 72, and divide this into 162, obtaining 2¼; then by using 72 on the lead screw and the intermediate couple with a ratio of 2¼ to 1, or 72 to 32, we have the required train; that is, 24 on the spindle, with 72 and 32 on the intermediate stud, the 32 meshing with the second 72 on the lead screw. It may happen, however, that there is only one 72 in the set, which would necessitate a different train. Trying 32 for the stud pinion, the lead screw gear (simple), would be 32 multiplied by 6¾, or 216 teeth; and this divided by say 72 gives 3, which as a ratio to 1, would give wheels of 90 and 30, or other pairs in the same relation for the intermediate couple.

After figuring out a train of gears, it is well to test their accuracy before assembling, which also acts as a guide when placing them in the various positions. In a thread cutting train the product of spindle revolutions and the driving gears must equal that of the lead screw and the driven gears. For instance: in the last example, on the basis of one inch of carriage travel, the threads per inch on the work multiplied by the driving gears on the spindle and intermediate stud, must equal the produst of the two driven gears and the threads per inch on the lead screw, or

$$\frac{27 \times 32 \times 30}{90 \times 72 \times 4} = 1$$

thus proving the correctness of the calculations.

INTERESTING REVERSING GEAR

By J. Haliburton.

HAVING occasion to erect a certain mechanism in which the main shaft could be driven in either direction at will, and figuring that the probable outlay, together with the space required for reverse gears and clutches, and friction wheel trains, would entail prohibitive expense, the contrivance shown in the accompanying sketch was designed and constructed with very satisfactory results. The sketch A represents a gasoline engine pulley, while B is a wooden pulley used as a friction wheel when reversing, and as a belt pulley in the forward motion; one of the sills on which the machinery is supported is shown at D, while the beam C supports the end bracket of the driving shaft. The outer

end of the beam C is connected to the operating lever by the link shown, the lever being in a horizontal position. With C raised, reverse motion is obtained, the belt hanging by its own weight on the engine pulley A. When C is lowered, the weight of the shaft and pulley comes upon the belt, and forward or driving motion is obtained. The machinery is only loaded on the forward motion, so that the variation in the shaft alignment necessitated by the reversing operation is not sufficient to materially affect the working conditions. The length of the present shaft is about 5 feet, but a longer one could be used if aligning trouble should develop. By having the axis of B to one side of A, greater friction is obtained between the two pulleys when working in the reverse position. A suitable notch is provided to retain the mechanism in a neutral position when so desired. When operating in the reverse, and also during the accelerating period of the forward movement, a guide is necessary to keep the belt on the engine pulley. This arrangement has given very efficient service, and is as easily controlled as with a friction wheel train.

PORTABLE CRUDE-OIL FURNACE.

By J. Ralph

IN the erection of structural steel works, such as bridges, buildings, ships, etc., is it necessary that some convenient means be provided for the heating of rivets, dressing of tools or similar work, requiring the use of a small furnace, therefore, one that can be easily transferred to different positions, as the work progresses, proves the most efficient. Where the air for combustion is supplied from a central blower or compressor, the supply pipes and flexible hose often entail considerable expense for installation, and sometimes occasion injury to the workmen from their straggling position about the structure. The accompanying cuts illustrate a small crude-oil furnace designed by a structural steel worker, the operation of which has given very good satisfaction. The device is self-contained and can be placed upon the flooring or be readily applied to suitable members of the structure. It is hand operated but so designed that the minimum amount of labor is required in its manipulation.

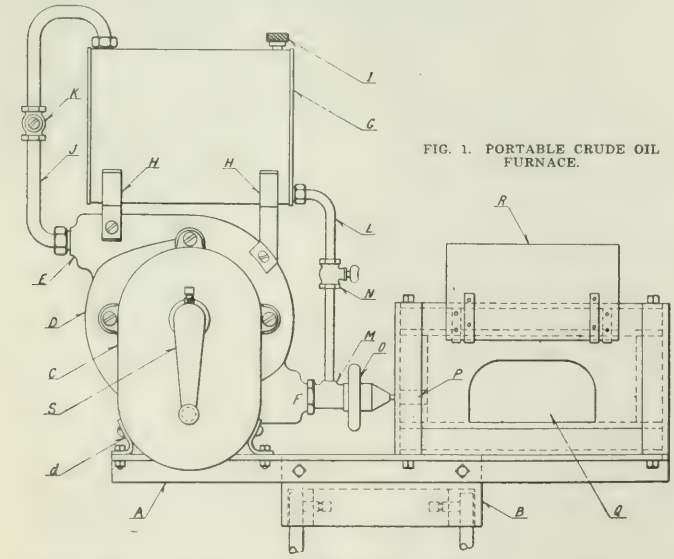


FIG. 1. PORTABLE CRUDE OIL FURNACE.

The sketch Fig. 1 shows a front view of the furnace, while Fig. 2 shows a sectional view of the fan and gearing. As illustrated in the former figure, the base A, made of angle iron, is supported on a central casting B which carries the four legs; the latter of a suitable length to raise the fire chamber to the desired height for convenient operation. The gear casing C, which is bolted to the fan casing, is attached to the frame by the small brackets (d). The fan casing is provided with two openings E and F, the air from the former supplying pressure to feed the oil from the tank, and the lower outlet F feeding directly through the burner to the fire chamber. The oil tank G is supported above the fan by the brackets H secured to the fan casing; while the tank is filled through the small opening 1, which is closed with an air tight cap. Air from the fan passes through the pipe J into the tank and above the oil, the check valve K preventing the return of the air when the fan is shut off. The oil is fed down through the pipe L to the burner M, the flow being regulated by the small pet cock N; this pet cock can be so adjusted that a pilot light will be maintained when the operator requires to leave the furnace, the oil under pressure being gradually forced to the burner. The intensity of the flame can be accurately regulated by the hand wheel O, cutting off or increasing the volume of air. The mixture passes through the opening P into the fire chamber Q, the opening to which can be covered by dropping the door R.

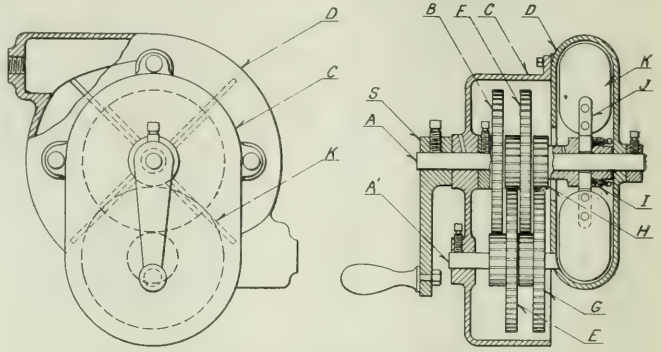


FIG. 2. PORTABLE CRUDE OIL FURNACE.

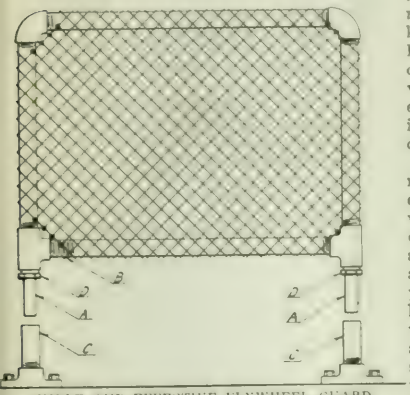
The sectional view of the fan and gear train gives an idea as to how the speed ratio of the fan blades is obtained. Secured to the main shaft A, which is operated by the crank handle S, is the first driving gear B which meshes with the pinion on the compound couple E, the gear on the latter meshing with the pinion of the couple F, which in turn transmits the power to G and thence to the pinion H. this pinion being integral with the hub I carrying the pins J, to which are riveted the blades K. The hub I which supports the fan blades is loose on the shaft A and revolves in the same direction as the operating handle S, but at a speed in relation to the ratio of the final to the primary movement of the gear train. In this instance where the ratio of the gear to the pinion is 3 to 1, the speed of the fan will be 81 revolutions to every turn of the handle S.

SIMPLE AND EFFECTIVE FLY-WHEEL GUARD

J. E. N.

IN addition to the necessity of effective protection from the dangers contingent to machine shop and power house mechanisms, it is often advisable to make ample provision for the temporary re-

moval of guards for repairs, cleaning up, etc. The guard shown herewith was installed to protect workmen from the flywheel on an engine, but same could be applied in any other dangerous location. As shown, the frame consists of 1½-inch pipe connected with standard fittings. Owing to the continuous construction of the frame, the last joint shown at B was made with an extra long thread so as to avoid left-hand fittings. In the outer end of each tee was placed a 1½-inch to 1¼-inch bushing D, into which was secured a short length of 1¼-inch pipe A, previously turned to a diameter that would slip into the short piece of 1½-inch pipe, screwed into the supporting wall or floor flange. The frame is covered by 1¼-inch mesh wire screen, a feature that prevents the hand or arm from being thrust through in case of a fall. A frame of this description can be readily lifted from its position for necessary repairs,



SIMPLE AND EFFECTIVE FLYWHEEL GUARD.

the supports remaining fixed to the wall or floor.

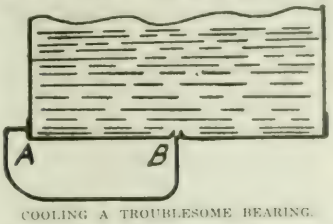
COOLING A TROUBLESOME BEARING

By J. E. McC.

TO aid in keeping a troublesome bearing cool, the oil recesses were capped with a tin cover, and a tomato can with a small hole punched in the centre of its bottom was suspended above the bearing and kept supplied with cold water. A small piece of waste placed on the tin cover was used for the water to drip onto, and from thence flow in different directions, instead of falling on the bare metal and flowing off in a single stream; too much waste is not advisable, as it was found that this would often prevent surface radiation from the metal and do more harm than good. The water kept the bearing cool enough for continuous operation, and having the hole in the centre of the can neutralized all rotary motion of the latter as its suspending cord twisted and untwisted with the changing weight. To open the hole if it became clogged, a wire was bent, as shown in the sketch. The distance from A to B was equal to the radius of the bottom of the can; therefore, with A placed against the side of the can at its bottom edge, the point B had only to swing to find the hole in the centre of same.

STROPPING A RAZOR

AT a meeting of hardwaremen in Melbourne recently, the question of how to strop a razor emerged,says Australasian

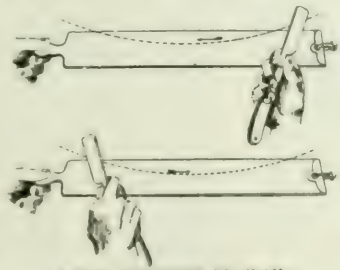


COOLING A TROUBLESOME BEARING.

Hardware and Machinery. One man said he had bought about twenty razors in as many years, some of them expensive knives, and was always having trouble. He had come to the conclusion that he couldn't strop a razor properly. Obviously it would be an advantage if every assistant who sells a razor were in a position to tell or show the purchaser how it should be stropped.

The razor is stropped to give it keenness of edge, in reality to clear of foreign matter the microscopic teeth with which the edge is fringed. Hence the desirability of using a suitable strop, a strop with a surface at once "nappy" and soft or pliable. The occasional application of a little olive oil tends to keep the strop in right condition. Even with a good strop, a man may be unable to get his razor right, because his stropping is faulty. The most common mistakes are stropping too heavily and too long. If the razor is in fair order a few passes on the strop, beginning with a slight presure, and ending with almost none, are all that is needed.

Note the position of the hand in the drawing and the direction of travel. The razor should be firmly held, not moved in the fingers, and should always be turned on its back, never on its edge. A firm hold of strop and razor and a



RAZOR STROPPING DIAGRAM

wrist action of the stropping hand—such are the methods of the expert. If the razor is gripped as shown there will be little, if any, risk of injury to either strop or blade.

The direction, as well as the weight and frequency of the stroke, is of great importance. "Heel to point," it ought to be, but not in a straight line. The curved stroke, experience shows, gives the best results. Rather difficult to accomplish at first, this semi-circular movement of the hand in stropping soon becomes easy enough. It only needs the practice of a few weeks to make it "second nature."

Another important point to remember is that the razor should be laid flat on the strop. The weight of the hand in stropping should really fall on the back of the razor if the rounding and consequent spoiling of the edge is to be avoided.

Nor is correct and careful stropping all that is required to secure a keen edge and a "close shave." A good strop for the razor and a good lather on the skin, a lather worked in as well as worked up, are essential.

Even with a good strop and good stropping, a time comes when a good shave is found impossible with any particular edge. The steel must be put on the stone.

SAFETY IN THE MACHINE SHOP HAND TOOLS.

ALTHOUGH machines are now employed for a large part of the metal shaping and forming work that was formerly done by hand, there still remain many operations that require the use of hand tools, says The Travelers' Standard. Among these are filing, chipping, benchwork in general, and blacksmithing. The thought of danger is specially associated with moving machines, but although these do cause a great many accidents, a surprisingly large proportion of the injuries received in machine shops results from the use of hand tools.

The possibilities of accidents in connection with machines are easily apparent. The swift, untiring motion, and the grinding, clattering, and whirring sounds, suggest relentless force; and while machines are in motion, contact of any portion of the human anatomy with certain parts of the machines almost inevitably results in personal injury. Carelessness may or may not be an important factor in an accident of this kind.

Hand tools, however, are apparently quite harmless; yet (as stated above), they cause many accidents, and nearly all such accidents may be fairly attributed to personal carelessness or neglect. Mishandling tools, neglecting to keep them in good condition, and leaving them about in dangerous places, are forms of carelessness that cause trouble sooner or later.

Suppose a machinist is about to file a piece of work in a lathe. Handles come off from files quite frequently, and they are not always easily found when wanted. In the hypothetical case that we have in mind, the machinist starts work with a file that is minus a handle. When working close to the lathe dog, the end of the file is struck

by the dog and the pointed tang is forced back into the man's hand, wrist, or possibly into his abdomen if he is standing directly in line with the file. A similar accident may occur while working at the bench if the file breaks, or if it slips in the workman's hand, although the results are usually less serious in a case of this kind. **Never use a file without a handle.**

A painful accident sometimes occurs when a workman, in attempting to drive

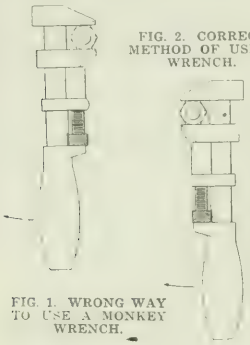


FIG. 1. WRONG WAY TO USE A MONKEY WRENCH.

FIG. 2. CORRECT METHOD OF USING WRENCH.

a file more firmly into its handle, grasps the tool by the handle instead of by the metal part. A heavy file will sometimes drop out in a case of this kind, remaining balanced in a vertical position on the bench for a moment upon the sharp tang. **In tightening a file by pounding on the bench, always grasp it by the metal part, instead of by the handle.** Some shops use safety handles of special design. In one form a hardened steel nut with sharp threads is inserted in the handle, and the handle is twisted on with considerable force. The sharp threads of the nut then cut into the tang and hold it securely in place.

Wrenches.

Another man may be setting up a large nut with an open-end wrench that

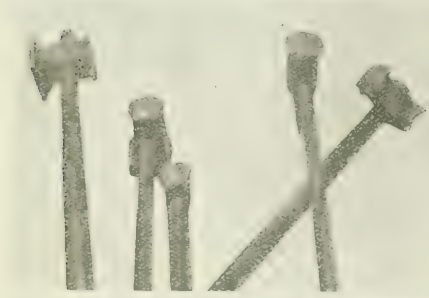


FIG. 3. MISCELLANEOUS TOOLS IN POOR CONDITION.

is a trifle too large for the nut, or the jaws of which have been battered or twisted out of shape by mistreatment. In either case the wrench is likely to slip off the nut, and the workman's knuckles may come in contact with some hard object and be cut and bruised, even if nothing more serious occurs. **Use a wrench that is in good condition and of the proper size.**

Workmen often use monkey-wrenches for hammering, and thus damage the jaws or the adjusting screws, so that when the wrenches are put to their proper use the jaws slip around the nuts and more knuckles are bruised and require attention. **Never hammer with a monkey-wrench.**

Similar bruises often result from applying monkey-wrenches improperly. If the wrench is used in the position shown in Fig. 1, for tightening a nut, the jaws are likely to spread and to slip off the nut when force is exerted upon the wrench handle. The correct method is shown in Fig. 2. When the wrench is used in this way to pull on the handle tends to tighten the jaws, and thus cause them to grip the nut more firmly. As an additional precaution, avoid using a monkey-wrench as a substitute for a socket wrench, whenever possible.

A chipper who fails to wear goggles and to provide a needed screen to protect other persons against lving chips from his work, has only himself to blame if the chips strike his own eyes, or those of some other person, and cause painful injuries.

Miscellaneous Tools.

The danger associated with the use of punches, cold-chisels, hand drills, and other similar tools, when the heads are worn, burred, or "mushroomed," has been pointed out by nearly every writer on safety topics. Men continue to use these defective tools, however, and, as a re-result, from time to time flying burrs or spalls that break off inflict cuts and bruises on the arms or faces of the users, or of persons near by. When the flying fragments of metal strike the eye, the result is likely to be a permanent injury or even a total loss of sight. Furthermore, when the tool being struck has a burred head, the hammer is more likely to slip off and injure the hand that is holding the tool. **Have chisels and other similar tools dressed whenever the heads are burred.**

No workman should knowingly use a sledge hammer that is loose on its handle or that has a split handle, nor any other defective tool. If the tools are the individual property of the workman, he should inspect them frequently and have them put in good condition before using them; and if they belong to his employer he should notify the foreman if they are defective, and insist on having safe implements. A good plan is to have all hand tools, and particularly such tools as sledges and others with wooden handles, kept in the tool room to be checked out only when needed. In this way one man—the tool-room keeper—can be made responsible for seeing that no defective tool reaches the hands of a workman.

Tools left lying in passageways, and near the edges of platforms, benches, racks and shelves, and on step-ladders, are potential accident producers. "A place for everything and everything in its place," is the safe rule for sharp-edged, heavy and otherwise dangerous tools.

Insecurely placed work—perhaps a heavy casting or forging—often falls from the bench, endangering the feet and limbs of the workman. Avoid this danger by keeping such objects in safe positions, and by properly supporting or securing them, whenever necessary.

Every machinist doubtless knows that striking tempered steel with a steel hammer or other steel or iron implement endangers the eyes, but every little

FIG. 4. A BADLY BURRED FULLER.

while somebody tempts Providence by trying the experiment again.

When cutting a short piece from a rod or bar of metal with a sledge and a blacksmith's cutter, the short end, when severed, is likely to fly and injure someone, unless care is used to strike lightly when the rod is nearly cut through. The smith also knows (or should know) that to avoid flying pieces he must stand at one side when doing his work.

Broken and bent tongs and tongs that do not fit the work are unsafe. Repair all broken tongs at once, or put them in a safe place where they will not be used. Don't hang hot tongs in the rack, because someone may grasp them with the intention of using them, and be severely burned.

Contrary to safe practice, pieces of hot metal are often left lying about on anvils, benches and other places, and these may burn any person who attempts to pick them up. Mark hot pieces in some unmistakable way, so that burns from this cause will be avoided.

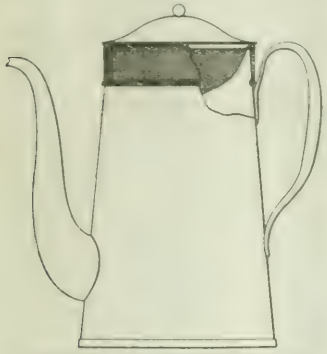
Finally, there is the ever-present danger of infection that is associated with even the slightest wound or abrasion of the skin. Such injuries are daily occur-

ences in machine shops, and are often considered too trivial to require attention. Nevertheless, they frequently lead to serious cases of blood poisoning.

INEXPENSIVE OIL FILTER

By J. Haliburton

CONSERVATION is an essential factor in every line of industry, and nowhere is this more pronounced than in the power plants of the country. Waste under existing conditions is next to criminal, and it is a commendable feature to not only eliminate all waste but to utilize to the utmost all available material so as to maintain the maximum efficiency is service and economy. The accompanying cut illustrates a very serviceable yet inexpensive strainer or filter for cylinder oil. This consists of a discarded teapot fitted with a portion of a close woven stocking leg. The short piece was sewn



OIL FILTER USING STOCKING LEG.

across one end and the open end placed over the top of the teapot body, the end of the fabric being provided with an elastic band or other means of securing it to the outer surface of the vessel; a groove similar to that shown offering an excellent facility for securing same. The loose end of the stocking leg is then allowed to sag down into the teapot to form a filtering pocket into which the oil is poured and thereby strained before it passes into the interior of the teapot, from which it is afterwards used by pouring from the spout in the ordinary manner. To prevent the flange of the lid cutting the fabric, it is either removal or given an inward curl.

STEEL EMBARGO ON AUG. 15

A WASHINGTON despatch to the New York Times says: The Department of Commerce served notice on Canada on August 8 that the embargo on steel needed for shipbuilding would become effective absolutely on August 15, as announced by the President on Aug. 2, and that after August 15 special licenses must be obtained for all iron and steel products leaving this country. Even steel, iron, and steel products for manufacture of ammunition will not be permitted to cross the border except under a license. The ruling follows:—

"The attention of shippers to Canada is called to the Presidential instructions given to the press on August 2 concerning shipments of iron and steel products covered by the proclamation of July 9, which instructions supersede all previous regulations. Up to the present, shipments of those iron and steel commodities into Canada have been facilitated through the granting of special licenses issued through the collectors of the ports. From this time on, special licenses will be required on all shipments of iron and steel products, in accordance with the President's instructions of August 2. Shippers will, therefore, save themselves annoyance and delay if they will apply for licenses before making shipments to Canada, as otherwise such shipments will be held up at the border."

STEEL SUPPLY LESS THAN DEMAND

REPORTS of a sharp drop in steel prices are characterized as not well founded by one of the leading steel men in the United States. This authority, who is regarded as one of the keenest observers in the industry, says that for every ton of steel made there is a demand for three tons, and as long as this condition exists prices will maintain their levels.

On the question of Government regulation of prices, he suggests that the Government authorities must now be beginning to realize what a tremendous undertaking they had assumed when they determined that a single price for all sales, whether to the United States, to the Allies or to private consumers, be fixed. There was only one way, he declared in which this could be accomplished, and that was for the Government to take over, operate and distribute the mills and their products, a task too gigantic for consideration.

A fair average cost, he said, could not be arrived at, as a level at which the big producers, who are integrated, could sell would often mean bankruptcy for the smaller producers. The quoted levels for certain products, extravagant as they seem, mean only a fair margin of profit for many small mills, although they mean huge profits for the big concerns.

What the Government needs most of all, he says, is production, and then more production. If prices are set at a level where the marginal producer cannot make a profit, he must go out of business. This means reduced output and a shortage of material.

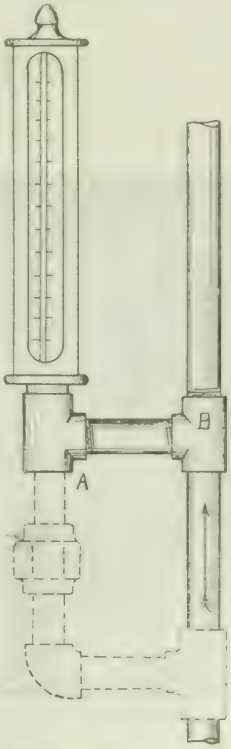
As far as profits of the big producer are concerned, these can be minimized by taxation on excess earnings, and the report of the Steel Corporation, showing nearly $54,000,000 estimated excess profits taxes in a single quarter, indicates what an important source of revenue these excess profits may become.

MAKING THERMOMETER REGISTER CORRECTLY

By K. Noble.

A THERMOMETER connected on a hot water pipe did not register correctly. It was connected as shown in sketch, a plug being in the end of the tee at A.

The plug was removed and a pipe connected as shown by the dotted lines



MAKING THERMOMETER REGISTER CORRECTLY

and everything was O.K. The flow of the hot water is shown by the arrows. Of course an angle end thermometer could have been secured and connected into tee B. However this would have partly obstructed the upright, but even if this would make no difference it cost less to make the change than it would to buy another thermometer.

For White Metal Patterns. What is said to be an excellent mixture for white metal patterns is: Tin, 50 per cent., and zinc, 50 per cent. Where the minimum amount of shrinkage is required the formula is modified slightly as follows: Tin, 50 per cent.; zinc, 49 per cent., and [illegible], 1 per cent.

The volume of gas varies inversely as the absolute pressure, and directly as the absolute temperature.

CONTEMPORARY WAR ARTICLES

Embracing Information and Data Drawn from a Variety of Sources Relative to and Arising from the Prosecution of this Many-Sided European War

MACHINES AND APPLIANCES FOR MUNITIONS MAKING

THE text and accompanying illustrations refer to a special Vicker's type lathe manufactured for them at Barrow and elsewhere. Working drawings of it have also been supplied to the Lancester Ordnance Accessories Co., and to the Ministry of Munitions. The main features of the design are simplicity, strength, adaptability and compactness. Figs. 2 to 7, Figs. 8 to 10, and Figs. 11 to 14, show machines respectively arranged for trimming off the rough end, boring and facing the nose, and threading the base of the interior for the adaptors on large shells. A glance at the illustrations will show that the machines for these various and very different operations are in their main features identical.

As a characteristic machine we may deal with the simplest form—that illustrated in Fig. 1, and shown in detail in Figs. 5 to 7, and intended for parting the rough end of the shell forging preparatory to turning the outside and boring the interior. It will be seen that the lathe consists of a simple box-bed and two cast-iron side frames which carry the bearings for the main and pulley spindle. The main spindle is of large diameter and hollow, and is driven by a single reduction gearing from the pulley spindle. The latter is fitted with fast and loose pulleys, so that the machine requires no countershaft. The belt control fork is operated from a hand lever mounted on the machine frame. The hollow spindle is of sufficient internal diameter to take the shell forging, and is of such length that when the shell is nested in it the projecting end is in a convenient position for being operated on by a parting tool carried in the rest.

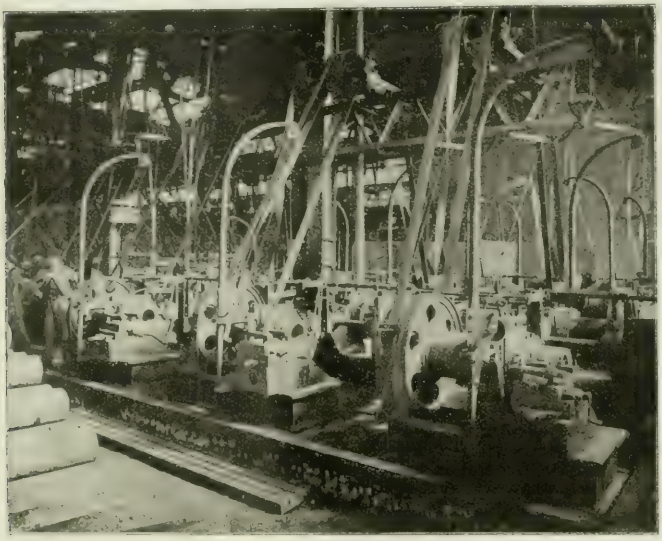
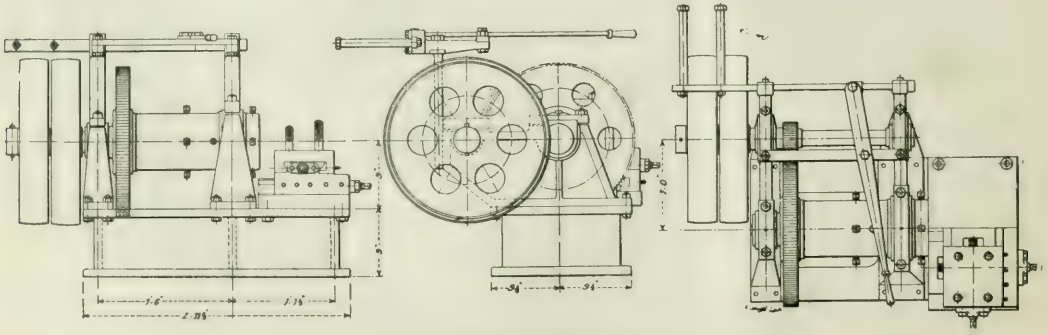


FIG. 1. LAYOUT OF MACHINES FOR TRIMMING MEDIUM SIZE SHELL.

The shell is held in the spindle and driven by pinching screws as shown. As will be seen, the tool rest is carried on a block bolted directly to the box-bed, and is fitted with both cross and longitudinal traverse. The cross traverse, which is, of course, used for parting off, is fitted with a ratchet feed gear, the feed-ratchet pawl being driven from a reciprocating shaft carried on the front of the bed and operated from a crank pin on the outside end of the main spindle. It may be said that experience has shown that the girls who operate these machines prefer to feed by hand. This method of working entails no change in the machine.

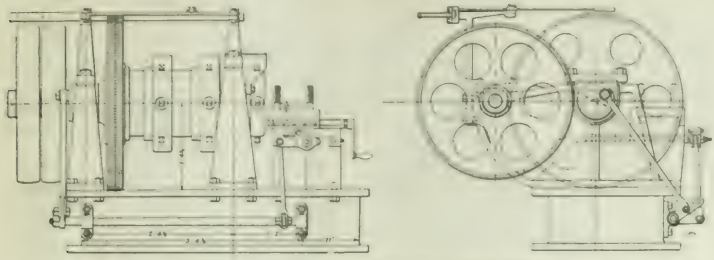
The lathe, exactly as described above, is suitable and is used for facing the base of the shell as well as ripping the open end, while a similar type of machine, built for a smaller class of shell, is illustrated in Figs. 2 to 4. In this case no ratchet feed gear is fitted. When facing the base greater accuracy in setting up is necessary, since the shell is turned and bored before this operation. To facilitate this setting up, a ring hollowed out cone-shaped is fixed at the back end inside the hollow spindle. The nose of the shell fits into the cone and the back end of the shell is thus automatically centred. A drawback screw is used to pull the shell into the cone.

For facing and boring the nose, the



FIGS. 2 TO 4. DETAIL OF MACHINE FOR TRIMMING MEDIUM SIZE SHELL.

machine takes the form illustrated in Figs. 8 to 10. As will be seen, the principal modification introduced is the fitting of the kicker feed gear on to the



FIGS. 5 AND 6. MACHINE FOR TRIMMING LARGE SHELL.

longitudinal traverse instead of the cross traverse. The boring is of course the main part of this operation, the facing being a small job which can easily be carried out with the hand feed. To facilitate centring in this case a cone is fitted inside the hollow spindle, on to which the bored-out open end of the shell fits, so that the back end of the shell is automatically centred.

The lathe for the internal screwing of the base end of base adaptor shells is illustrated in Figs. 11 to 14. The construction in this case is a little more complicated, but the machine in its main lines remains the same. The tool rest, instead of being bolted to the bed, is arranged to slide, and is operated by a leading screw driven by a train of wheels in the usual way. On the pulley spindle there are two pinions of different sizes, one or other of which may be thrown into action by a dog clutch. One of the pinions drives the main spindle through an idle wheel, and the other drives it direct. The result of this is that as the clutch is thrown over the direction of rotation of the main spindle is reversed.

A special feature of the machine is that the nut which traverses the slide rest is solid, and is always in position on the leading screw, so that it is impossible to get the rest out of pitch with the thread which is being cut, as might be possible were a split nut used. This point is an important one, as the lathes are operated entirely by unskilled labor.

If it is desired that the slide should remain at rest, the leading screw-driving train is thrown out of action by a lever, which can be seen at the front of the machine at the left-hand side. A square turret is fitted, and four tools are required to carry out the full operation which the machine has to perform. They consist of recessing at the back end of the thread, counter-boring, screw-cutting and chasing. With the different-sized pinions on the pulley shaft, the machine runs at different speeds in the two directions. The quick speed is used only for traversing the tools into position, and all cutting is done on the slow return. This machine, as well as the others described, has proved very satisfactory in the hands of girls.

Two other details used in connection with this Vickers' lathe are illustrated in Figs. 15 to 17, and Figs 21 to 23. The first of these devices is an ingenious and simple screwing attachment for cutting the thread in the base of shells with screwed baseplates. This appliance is self-contained, and is held in the tool rest. It consists of a pair of levers which can be brought together, or moved apart, by a toggle with a handle. One lever carries a half-nut which gears with a thread cut on the outside of the nose of the main hollow spindle of the lathe, while the other carries a chaser which cuts the thread in the shell base. The whole attachment is arranged to slide on a block attached to the tool rest. To use the device it is placed in position with the levers embracing the shell end; the toggle is then closed so that the half-nut engages with the thread on the spindle and at the same time the chaser comes in contact with the interior of the baseplate recess. The whole arrangement then travels along

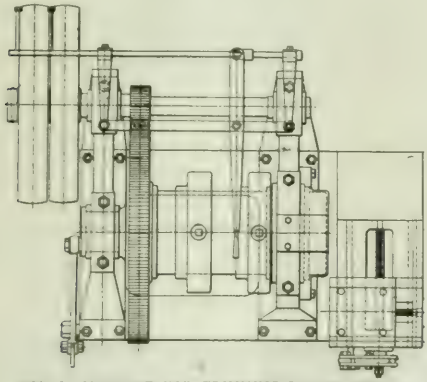


FIG. 7. MACHINE FOR TRIMMING LARGE SHELL.

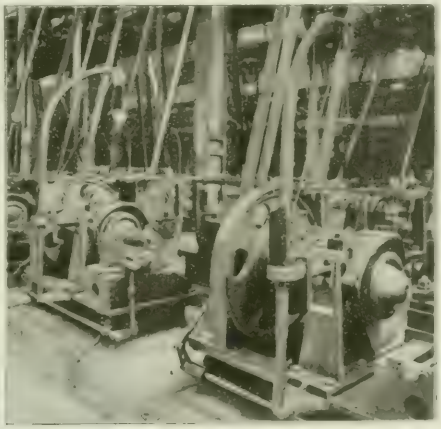
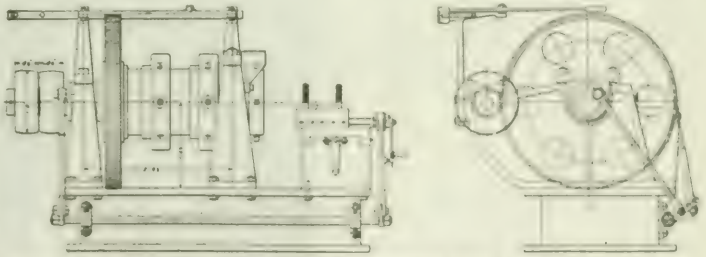
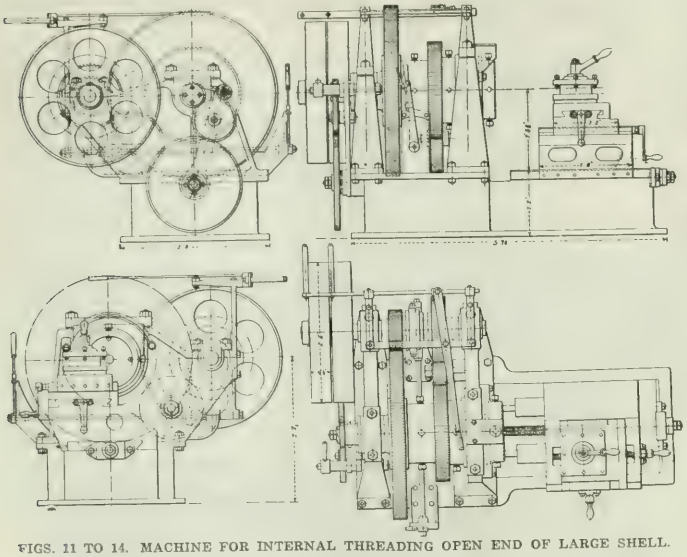


FIG. 8. LAYOUT OF MACHINES FOR FACING AND BORING NOSE OF LARGE SHELL.



FIGS. 9 AND 10. MACHINE EQUIPPED WITH SURFACE FEED GEAR FOR FACING AND BORING NOSE END OF LARGE SHELL.

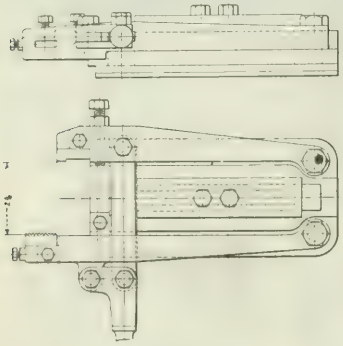
owing to the rotation of the lathe spindle and the engagement between the half-nut and the thread on the spindle nose, with the effect that the chaser produces



FIGS. 11 TO 14. MACHINE FOR INTERNAL THREADING OPEN END OF LARGE SHELL.

a thread of similar pitch on the shell. The depth of thread cut is regulated by the adjusting screw shown in Fig. 16. It will be clear that this device enables the base end of shells to be threaded in a simple non-screw-cutting lathe.

The other detail, Figs. 21 to 23, is a simple davit, which is attached to the front of one of the side frames of the lathe. It is fitted with a lifting drum having a ratchet detent. With this davit a girl can lift a rough 9.2-in. forging into a parting-off machine. These davits have mainly been introduced to reduce the work required from the overhead



FIGS. 15 AND 16. LARGE SHELL BASE THREADING ATTACHMENT.

cranes and to render the lathes largely independent of them. They have done much to increase output. The lathes illustrated in Figs. 1 and 8, are all fitted with them.

A similar device, employed in connection with lathes of a more ordinary type, is shown in Figs. 19 and 20. This is a crane with a swinging jib and fitted with the same type of lifting gear as

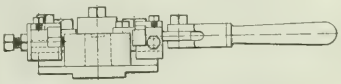


FIG. 17. LARGE SHELL BASE THREADING ATTACHMENT.

that just described. This crane is usually set to serve two lathes, swinging over one to feed that behind. There is no travelling monkey on the jib, the crane being so set that the shell being lifted swings exactly into the lathe centres, or chuck, as required. The lathes are, of course relatively so placed that the load comes where required for each of them. The crane post is usually set over a little out of the vertical, so that when not in use the jib swings inward and cannot be left standing out into the bay, where it might catch passing loads carried by the overhead travellers. These cranes are easily operated by girls.

Fig. 18, shows another lifting appliance which has proved of great service in handling the heavier classes of shell. As shown, it is fitted to serve a copperband press. The crane consists of a simple radial jib made from a joist. the inner end of the jib is carried by the ram of a vertical hydraulic cylinder. Guides and tension rods, which can be seen in the figure, guide and support the jib. The control is by a single valve, which puts the cylinder either to pressure or exhaust and causes the jib to rise or fall. A diaphragm is fitted in the exhaust to prevent too rapid descent. The monkey on the jib has no travelling gear. It is simply pulled along by pulling on the hanging shell or fall. The crane has proved speedy and convenient entirely in the hands of girls.

Fig 24, illustrates a vertical drilling machine of ordinary type. It has been introduced because a necessary adjunct to the lathe illustrated in Figs. 8 to 10. When machining the nose end of the shell in this lathe, no attempt is made to thread the hole for the reception of the fuse bush. This is done by tapping in a drilling machine as shown in the figure referred to. The work could be, and frequently is, done by chasing in an engine lathe, in which, of course, the boring and facing can also be done at the same setting. The advantage of the method described, however, is that, in addition to the simplicity of the lathe used, the tapping is a simple and speedy

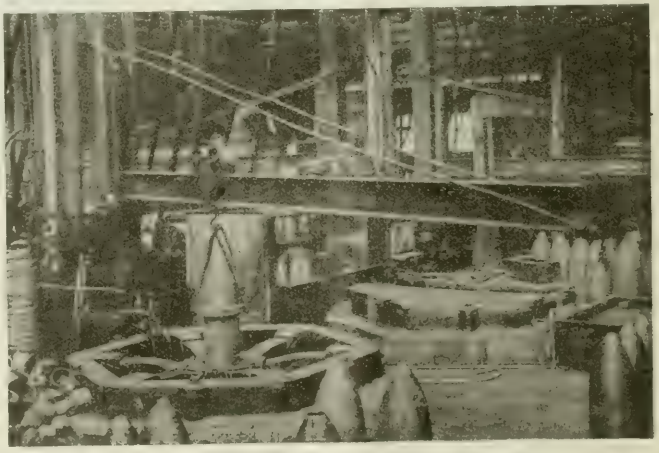
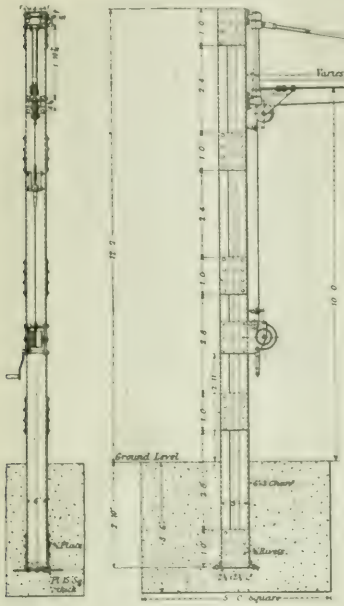
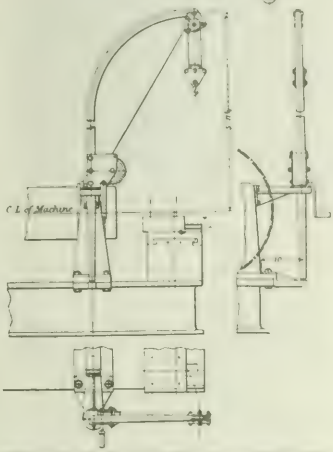


FIG. 18. LIFTING EQUIPMENT AT COPPER BAND PRESS.

operation, easily carried out by unskilled labor and giving, with no difficulty, a fusebush hole correct to gauge. The amount of scrap made is also very small. —*Engineering.*



FIS. 19 AND 20. JIB CRANE FOR HANDLING LARGE SHELL AT LATHES.



FIGS. 21 TO 23. DAVIT ON LATHE FOR LIFTING SHELL.

BENZOL AND TOLUOL—RECOVERY FROM COAL GAS

BEFORE the war, not even the gas engineer himself realized what a power his industry constituted in the direction of the provision of those ingredients essential to the production of modern explosives. Even now, few beyond the confines of the industry appreciate fully that it is to the gas works and kindred establishments that we owe the unprecedented supplies of benzene and toluene now available, while the strides made in the production of synthetic phenol must not be overlooked nor the more recent call for concentrated ammonia liquor.

The importance of the light hydro-carbon oils obtained from gas (from which oils are, in turn, obtained benzene, toluene, and xylene), may be emphasized by a consideration of the products which may be obtained from or with the aid of the aromatic compounds. For instance, benzene is the source of nitro-benzene, aniline, and a host of drugs, while it is the basis of phenol as produced synthetically by the recently introduced and largely extended process. The phenol thus obtained is, again, the parent substance of the well-known explosive lyddite. Toluene, it need scarcely be pointed out, forms the staple ingredient for the high explosive T.N.T. (tri-nitro-toluene), while for other purposes it provides such substances as saccharin, oil of almonds, and benzoic acid. Xylene, too, is the basis of other forms of explosive.

Motor Spirit and Dyes

It may be questioned to what account these products can be turned when the prodigious demand for explosives has come to an end; but it will not be forgotten that some time before the war certain concerns were in evidence which proposed to treat coal under prescribed methods of low temperature carbonization in order to recover a maximum quantity of those condensable products from which could be obtained a supply of spirit suitable for the petrol engine. Without low-temperature carbonization, the idea of which by no means meets with general approval among gas engineers, the war has solved the question of motor spirit from coal, and it has solved it in such a manner that the gas works can increase (if extreme lengths are gone to), their output of spirit twentyfold without altering in the slightest degree the prevailing systems of carbonization.

FIG. 24. DRILLING MACHINE FOR TAPPING FUSE BUSH HOLE.

It is only necessary to point out that were the whole of the gas produced in the United Kingdom completely "stripped" of its aromatic hydro-carbons there would result a yield of benzene products equivalent to nearly 40 million gallons per annum, whereas coke-oven establishments, which, by reason of the special purpose for which they exist, can practise the most thorough extraction, would contribute approximately another 60 million gallons. The importance of the whole question is, then, self-evident when it is remembered that after the war the annual consumption of motor spirit is not likely to exceed, at any rate for a time, some 150 to 170 million gallons. Owing to the serious and successful endeavors which are now being made for the recovery of the dye and kindred industries there will, of course, be a growing demand for benzene and toluene which form the basis of many such products.

Modern Gas Works Methods

The question of calorific power has a direct bearing on the ability of the gas works to increase the supply of light spirit. As ordinarily manufactured, coal gas contains from 3½ to 4 per cent. of those hydrocarbons from which luminosity is entirely derived. Of these compounds about one quarter consist of benzene and its homologues, that is to say, the benzene hydrocarbons in the gas amount to about 1 per cent. by volume. Before the introduction of means for recovering the benzene and toluene from the gas, the only available supplies (except in the case of those undertakings works which have carried on stripping for some years) were those derived from the ordinary fractional distillation of coal and other tars.

In the early days of the war the exigencies of the situation were such that instant measures for increasing the output were demanded; and, as the provision of the necessary apparatus for most effective recovery of crude spirit from the gas would have entailed serious delay, temporary expedients were introduced which, though they could be regarded only as a makeshift, certainly relieved the situation until more productive processes could be installed.

As practised to-day the process of benzol recovery consists in subjecting the gas to thorough scrubbing with an absorptive medium consisting of creosote oil, or, more commonly, a special coal-tar distillate known as green oil, which is allied to ordinary anthracene oils. These oils possess a solvent affinity for benzene, toluene, and certain other low-boiling constituents of the gas, with the result that these hydrocarbons are washed out while the remaining constituents are unchanged. After passing in contact with the gas the oil, charged with the benzene hydrocarbons, is collected for treatment in a special recovery plant.

Recovery by Tar Washing

Fortunately when the demand for benzene and toluene first came to be realized it was found that ordinary gas tar could be employed as a washing agent, although its capabilities as a stripping medium are considerably inferior to those of the recognized green oil. The utilization of tar, however, meant a considerable saving in time, for there were few gas works of any pretension in which it was not found possible to set aside an existing scrubber for the purpose, the benzolized tar being afterwards delivered to the distiller as in the ordinary way. The following figures will prove instructive in that they enable an opinion to be formed as to the extent to which the temporary tar process relieved the situation. But, again, in the light of present-day developments it can be seen that the tar process must be looked upon as little more than an attempt to play with the question of benzol recovery:—

	Benzene	Toluene
	Lb. per ton of coal carbonized	
Originally obtained from tar	0.4	0.13
Recovered by tar-washing process	1.5	0.75
Recov'd by green oil methods	10.0	3.50

The figures for green oil given in the above table do not represent maximum recovery, but are merely indicative of the results which may be expected under normal gas works practice and as a result of which the quality of the gas would undergo no appreciable deterioration as regards calorific power. At the present time green oil extraction has extended to nearly all the larger gas works, and the quantity of crude spirit recovered varies in accordance with the quality of coal gas made and the extent of stripping deemed advisable, to from 1½ to 3 gallons per ton of coal. Thus, it is possible, but not generally expedient, to obtain, not a total of 13½ lbs. of benzene and toluene as shown above, but so much as 20 lbs.

The crude spirit contains on an average from 50 to 70 per cent. of benzol, 10 to 20 per cent. of toluene, and 1 per cent. of xylene, the difference consisting of certain light naphthas, some naphthalene, and tar acids. As the development of the process has progressed it has been found possible not only to increase the efficiency of extraction but to improve the quality of the product obtained, with the result that some of the later forms of plant have succeeded in turning out, with careful regulation, a crude spirit containing nearly 80 per cent. of benzol.

Recovery Plant

Nearly the whole of the plant required for the recovery of benzol and toluol is in connexion not with the washing of the coal gas, but with the treatment of the solvent for the separation of the crude spirit. In this direction the process is certainly economical, for the absorptive oil may be debenzolized and returned again into circulation with little, if any, loss. The benzolized oil, when sufficiently saturated, is passed through a series of heat interchangers, where its temperature is raised to some 55 deg. C. before passing into the preheaters. In these preheaters the oil is raised in temperature to about 115 deg. by means of a dry steam arrangement, and it then passes direct to the still. The still itself most commonly consists of a number of super-imposed cast-iron trays down which the oil splashes and up through which a small and carefully controlled jet of live steam is blown.

It is this steam which expels the light hydrocarbons from the oil, the benzol vapours passing away from a take-off pipe attached to the apex of the still, while the wash oil, freed from the hydrocarbons absorbed during the washing process, runs away from the base of the still, back through the interchangers where it gives up a portion of its heat to the inflowing benzolized oil, and passes finally through a combined atmospheric and water-cooled condenser. The cooled oil is then ready for further use in the absorption scrubber.

So far as the general run of gas works is concerned the operation of benzol and toluol recovery ceases here, and the crude spirit obtained by distillation is disposed of to those larger concerns which possess facilities for rectification. The quantity of wash-oil circulated amounts to anything from 40 to 60 gallons per ton of coal carbonized, but for maximum extraction the latter quantity must be looked upon as the minimum, while for maximum saturation recirculation of the oil in contact with the gas should be arranged.

In a brief review of the process, it is not possible to make mention of the host of practical points which require attention if the process is to run smoothly and with efficiency. The industry has now, however, the benefit of two years' experience, and it may be said that as each additional plant is erected some improvement is introduced. As a general rule it must be recognized that wrought iron or steel should be used very sparingly in the construction of the plant, particularly if the gas dealt with is not entirely freed from its ammonia. The majority of the most successful plants are at the present time almost solely built up from cast-iron, which seems to withstand satisfactorily any of the corrosive influences which are sure to be encountered. Water in the wash-oil is most strongly to be guarded against, for as the percentage of water increases so is there a proportionate loss in the efficiency of extraction. It is generally stipulated that the water content should not exceed 1 per cent.

Effect on the Gas

Gas as now supplied has its critics, but consumers who understand the true facts have no cause for the dissatisfaction. Those who make use of the incandescent burner have more to gain than to lose by the new conditions, for flame temperature—providing the proportion of incombustibles is kept low—is actually higher with partly stripped than with unstripped gas. Practical acquaintance with benzol recovery has shown that it is quite possible to reduce the normal 14-candle gas to eight or even six candles, although the process is never carried so far. The effect on calorific power, however, is comparatively trivial. For instance, recent experiments have indicated that the percentage loss is approximately as follows:—

Crude spirit extracted gas, per ton of coal.	Loss in Calorific Power.
2.1 gallons	4.5%
2.5 gallons	7.0%
3.0 gallons	8.0%

It is evident, then, that with what virtually amounts to complete extraction a normal gas of 550 B. T. U., per cubic foot would, after treatment, still possess a calorific power of well over 500 B. T. U., the standard which has as yet been stipulated for those undertakings operating under the new Calorific Power Act.—Times Engineering Supplement.

FERRO-CONCRETE SHIPS

A GOOD deal has recently been written with regard to the building of ships with ferro-concrete. Unfortunately, the subject has been shrouded in much mystery, and no serious attempts have been made to make a careful comparison between ferro-concrete and steel vessels. The advocates of ferro-concrete construction, whether they believe it or not, try to make it appear that ferro-concrete is a better material for building ships than steel. It undoubtedly has advantages, but it is not reasonable to expect that a material like ferro-concrete which, weight for weight, is much less strong than steel can possibly produce a ship which will carry as much dead weight per ton of its weight as a steel vessel. On the other hand, ferro-concrete is clearly cheaper per ton weight than steel.

Ferro-Concrete Ship Cheaper

As a financial proposition, therefore, the building of ferro-concrete barges reduces itself to this: a certain weight of cargo has to be carried in a ship or a barge, or taking the more elementary consideration, say a barge. It has been very well established that the weight of the ferro-concrete ship will be greater than the steel ship required to carry the same weight of cargo. On the other hand, since ferro-concrete is a cheaper

material than the steel, the ship constructed of the former might still be less expensive to build than the latter. Generally speaking, it may be said that the ferro-concrete ship will be cheaper. This then is a distinct point in favor of the new method of construction.

The Power Feature

There are, however, other things to be considered. Since the weight of cargo is the same in the two ships under comparison, and the weight of the new type of ship is greater, the total displacement of the ferro-concrete ship will be more than that of the steel ship. In consequence, she will require more power to drive her, or if she is towed, more power to tow her. This, however, is not so serious as it at first sight might appear.

It may be taken that the ferro-concrete ship is two-thirds as heavy again as a steel ship. This increase of weight, however, is much less when expressed as a fraction of the total weight of ship and cargo, and generally speaking would only be about 15 to 20 per cent. In towage work this would not be a very serious matter. It would, of course, be of far more importance in self-propelled vessels, especially if high speed was necessary.

It is thought by some that a ferro-concrete vessel could be made to stand up to its work in a seaway. This, however, is purely a matter of design and is entirely decided by the amount of reinforcement that is put into the concrete. All kinds of structures have been built of reinforced concrete, which have to stand stresses and strains, such as bridges, girders, warehouse floors, etc., as well as large water tanks. There are, of course, special things to be thought of in a ferro-concrete ship which do not arise in connection with land structures. Here, again, these are matters of design, and can only be settled by a competent naval architect.

STEEL FREIGHTER "ORLEANS" TAKING THE WATER.

A Practical Proposition

It may be taken that the ferro-concrete ship is a perfectly practical proposition, and one more argument in its favor at the present time is that it will carry a much greater weight of cargo on a given amount of steel than will a steel ship. With the present shortage of steel, this is of first importance. Whether the ferro-concrete ship will continue to be used after the war is over, when it may be assumed that the supply of steel will be more plentiful, is a matter for some speculation, but there would seem to be no reason why it should not.

To sum up, the ferro-concrete vessel costs less to build, and requires much less steel per ton of deadweight carried, and in addition, its cost of upkeep is small.—Liverpool Journal of Commerce.

STEEL FREIGHTER "ORLEANS" ON WAYS JUST PREVIOUS TO LAUNCHING

FREIGHTER "ORLEANS" LAUNCHED

PUNCTUALLY at noon on August 2, the bulk freighter Orleans was launched from the Thor Iron Works, Toronto, under the direction of Louis Dahlgren, general manager of the plant. The launching was a great success, and was witnessed by a large and appreciative crowd, among whom were many well known marine men, engineers and captains of industry. The christening ceremony was performed by Mrs. Stewart Playfair, who was presented with a bouquet of roses by the builders and a jewelled pendant by James Playfair. Among the guests present at the ceremony were: Mr. and Mrs. James Playfair, Mr. and Mrs. Stewart Playfair, Mr. and Mrs. Louis Dahlgren, Mr. and Mrs. Frank Barber, Col. J. B. Miller, Hugh Calderwood, R. A. Barber, George McKellan, John G. Kent, E. S. Cousins, W. Newman, Capt. Winstrup, Capt. J. B. Foote, Capt. Nillson, H. G. Kelly, Allan Scott, H. Langlois, J. B. Kilgour, Mrs. Charles Lee, Martin McCarron and Miss McCarron, W. W. Watson, John E. Russell, J. W. Woods, Mr. Reid, Col. Duff, F. C. Brunke, Mr. and Mrs. Kendall, Mr. Norman B. Gash, K.C., Harry T. McMillan, A. E. Gilverson, Prof. and Mrs. Treadgold, Mrs. Geo. McLeod, M. R. Gordon, Grant Gordon, Stanley McConnell, Geo. A. Mitchell, Ald. Donald C. MacGregor, John A. Montgomery, D. L. White (Midland), Fred. Hand, Capt. Wm. Evans, E. A. Mathews, Wm. J. Sheppard (Waubaushene), T. B. S. Benson, John G. Gwynne, Lloyd's surveyor; J. M. Wilson, A. G. Webster and many others.

The Orleans was originally ordered for the Great Lakes Transportation Co. of Midland, Ont., but was sold to the Oriental Navigation Co., of New York and Nantes, France, the latter being the port of registration. She has been built under Lloyd's special survey and classed 100A1, with carrying capacity of 4,300 tons, length, 261 ft.; breadth, 43 ft. 6 in.; depth, 28 ft. 2 in.

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COAL VERSUS WOOD FUEL

By D. Street

THE rising cost of coal, as well as of other articles of all kinds necessary to industry has turned the attention of many users of coal to the possibilities of wood, and if the change is made from one class of fuel to the other certain necessary conditions must be carefully observed. The chemical composition of wood, when dried to 140 deg. Fahr. varies very little indeed, and the constituent parts of the various woods are as follows:—

FOR COAL VS. WOOD.

	Carbon	Hydrogen	Oxygen	Nitrogen
Beech	48.98	6.07	43.11	0.93
Oak	50.64	6.03	42.05	1.28
Birch	50.61	6.23	41.04	1.12
Aspen	50.31	6.32	42.39	0.98
Willow	51.75	6.19	10.98	0.98

The first three are hard woods, weighing about 50 lbs. per cubic foot, whilst the latter woods weigh about 35 lbs. so that the reputation of the heavier woods for producing more heat must arise from their greater density and smaller capacity for holding water. Their carbon and hydrogen content, per pound, is very much alike. The ash left by wood when completely burned varies from ½ to over 3 per cent.

Moisture in Wood

Wood, when felled, contains from 20 to 50 per cent. of water, and seldom even after storing has less than 15 per cent. while if brought during the rains it may have very much more. A purchaser should therefore be very careful to ascertain the amount of water in his fuel to adjust the price properly. Wet wood, when burnt by raising half of its weight in steam that passes uselessly into the chimney, may make a very unsatisfactory fuel. The amount of moisture in a supply of wood fuel may be ascertained by splitting several logs through the middle and planing an equal quantity of shavings from each. Mix the shavings and select a one pound sample to be dried in the air until it ceases to lose weight, and another pound to be dried carefully above the boiler, noting the temperature of the air among the shavings and weighing. The experimenter will then be able to ascertain the percentage of moisture in the wood when air-dried and stove-dried. In England dry wood is worth, for the purpose of steam raising, half its weight in English coal having only 5 per cent. of ash, but when the ash in coal amounts to 22 per cent, the ratios of value are considerable altered in favour of wood.

Much depends on the way in which wood is burnt. If used in large pieces there will be considerable spaces between them, and the total amount in the state of combustion will be reduced. There may also be an excess of air drawn through the fire. The fire bed, when wood is used, is more difficult to manage, and for the control of the draught it is well to have a door on the ashpit. When using wood fuel it is desirable to have the means of cutting it up cheaply into pieces of such a size as may be fed easily into the fire and properly managed for burning. A Cornish boiler has a more convenient furnace for wood burning than a Lancashire one on account of the greater size of the furnace flue and greater flame space, but an exterior furnace may be built to greater advantage for room, and is largely used in countries where wood is the only fuel obtainable.

BRIQUETTED COAL AND COKE

By O. C.

THE utilisation of small coal by mixing it with pitch and compressing the mixture into briquette form has been carried on for many years, but not so extensively in this country as on the continent, where much of the surplus pitch from English gas-works was formerly shipped for that especial purpose. In Britain the industry is confined chiefly to the South Wales coalfield, which produced in 1914, 1,600,000 tons, of briquettes out of a total British Production of 1,840,000 tons. Ninety-six per cent. of the coal briquetted was small Welsh steam coal. In briquetting the coarsely ground coal is dried, mixed with 6.5 to 8 per cent., of its weight of pitch, passed through a disintegrator, thence to a heater to soften the binder, and on to the briquetting machine.

Of more recent date is the application of the briquetting process to coke, and more particularly to the small waste which accumulates at gasworks, and is of little value. The method of use is of considerable importance at present, because, with the increased production of tar and the closing of the Continent to the shipments of pitch, this material is accumulating at most works, and the use of a portion to assist in converting the unmarketable coke into a fuel of the selling value of $3.00 per ton is a double economy. In his recent Harvard lecture on "Coal and its Economic Utilization." delivered before the Royal Society of Arts, Professor Brame gave an account of a coke briquetting plant installed at Smethwick Gasworks over a year ago, which has proved very satisfactory. In manufacture the coke dust is graded to pass a ¼-inch mesh sieve, and is mixed with 8 per cent. of pitch, this mixture being fed to the disintegrator. In the heater a little tar is added, and the hot mass briquetted at 6 tons pressure.

At Smethwick the plant relieves the works of about one-sixth of the pitch made. If then coke breeze were also briquetted, one-third of the pitch could be utilised. The briquettes are suitable for closed stoves, ranges, etc., and form the only boiler fuel used at the works. For the usual open grate the draught is insufficient to burn them without a proportion of ordinary coal.

STEEL IN REINFORCED CONCRETE WORK

By L. E. ..

Since reinforced concrete has been used in the British Isles., it has been customary to employ plain round mild steel bars but in a recent paper on the subject the author endeavoured to prove that plain. mild steel bars are not the best for this purpose. Arguments were brought forward to show that greater efficiency and economy is obtained by physically developing mild steel bars, for the purpose of taking out the first yield in the steel, which is useless and has a detrimental effect on the concrete. When this first yield or stretch is taken out, a higher yield point is obtained without any injury to the steel, so that it is safer to employ a stress of 20,000 lbs. per square inch (which results in a saving of 20 per cent. in the weight of steel required) than it was to employ a stress of 16,000 lbs. per square inch. before the steel was physically developed.

FLOW OF STEAM THROUGH A GIVEN ORIFICE.

By N. G. Near.

NAPIER'S formula is well known the world over in engineering circles as a "pretty good one" for determining the flow of steam through an opening into the atmosphere. It may be applied nicely to finding the weight of steam used by a steam jet blower such as is often used for inducing draft in the chimney or for forcing air through the grates directly. In other words, where the drop in pressure is great, Napier's rule is excellent.

I have often related my experience with Napier's formula, which is sometimes doubted; but it is absolute truth. I measured the diameter of an orifice to to the hundredth of an inch by simply applying this rule, and I had never so much as seen the orifice until after my computations were all made. I weighed the

water condensation from the steam that passed through the orifice and then determined the diameter of the orifice "backwards". The diameter was 0.16 of an inch. This is the formula

$$W = \frac{P\ A}{70}$$

, where W=the weight of steam passing through the orifice per second in pounds.

P=the absolute steam pressure in pounds per square inch.

A=the area of the orifice in square inches.

It is therefore evident that it wasn't much of a trick to use the formula backwards after knowing P and W.

This little chart is based on that formula. It gives the weight of steam flowing through the orifice per hour instead of per second (see column B.).

To show how the chart is used let us take an example:—"Where the area of the orifice is .07 sq. in. and the steam pressure is 100 lb. per sq. in., how many pounds of steam flow through per hour?

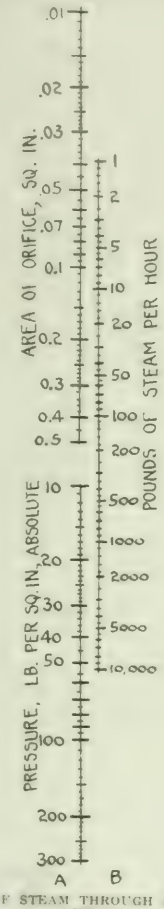
Find the .07 in column A and the 100, also in column A. Then find the point midway these two figures. Directly opposite the mid-point is the answer, 360 pounds per hour.

It is a simple matter to find the mid-point. If you have a slip of paper handy just lay it alongside the scale and double it between the two points. Get the idea? The mid-point is at the crease, exactly. You can't beat the method with the finest pair of proportional dividers made. Of course, if you have a pair of dividers handy, use them, or use a ruler. There are many ways in which a line can be bisected but some of them are easier than others. What we all want, always, is the easiest way.

Again, should it be desired to find the area of orifice necessary to carry away 360 pounds of steam per hour with a steam pressure of 100 lb. per sq. in., you would go at it in the "opposite" manner. Find the distance from the 100 (column A) to the 360 (column B), and then measure upward that self-same distance from the 360. The answer, of course, is .07 sq. inches, pound in column A.

Another application of this rule or chart is to the soot blower. It will tell at a glance the weight of steam used per hour in blowing soot. From the result one can easily compute the cost of steam for soot blowing. That is a subject that has scarcely been discussed, if at all. Have you ever thought of it? Why not use the chart or formula once in a while, here and there, and determine a few of your costs? Maybe they are more than you have estimated off-hand and maybe they are less.

Further, maybe you have a lot of leaky pipes in the plant. Maybe you have some cracked valves here and there which are purposely cracked to carry away the condensed steam. Maybe you feel that cracked valves are cheaper than a good steam trap. There are hundreds of ways, almost, which this chart can be used in and around a steam plant. Steam is expensive these days. It is growing more expensive right along. It should therefore be studied a bit more carefully. No harm can result from knowing the aproximate cost of every little operation where steam is used.



FLOW OF STEAM THROUGH A GIVEN ORIFICE.

BRITAIN'S MUNITIONS SUPPLY

IN the course of a review of the work of the Ministry of Munitions by Dr. Addison in the House of Commons, July 28, it was stated in regard to explosives that the capacity was now four times that of a year ago, and twenty-eight times that of March 1915. The shell supply, both in quantity and quality was adequate—in spite of the enormous expenditure during the last few weeks the stock of filled shell had only been reduced seven per cent., and premature bursts were almost negligible. "Tanks" of various types were under constant construction and development, and motor transport facilities were so great now that considerable help was being extended to the Allies in this respect.

Overseas munitions supplies had been received with gratifying regularity, losses due to submarine activities being only 5.9 per cent. of consignments.

Yearly steel production in Britain is expected to reach 12,000,000 tons by next March—it is now 10,000,000 tons as against 7,000,000 tons three years ago. An interesting point in this respect was the expected increase of 1¾ million tons due to the utilization of home ores in the making of basic steel. Gun ammunition costs had been reduced so as to effect of saving of over $200,000,000 on the year's bill for these supplies alone.

SEPARATING FINE GUN AND WHITE METAL BORINGGS.

A NEW method for separating fine gun metal and white metal borings has been perfected by the chief chemist of New South Wales Railway Department. The old method was by liquation on an iron plate or in a furnace, which was satifactory for coarse borings, but quite useless for fine grades. The problem of the removal of the white metal in the fine borings has been solved. The small borings are passed to a magnetic separator, picked up by a revolving belt fitted with pockets, and conveyed to an overhead bin, whence they gravitate to classifiers and are separated into three grades. From bins 1 and 2, containing the coarser material, the borings gravitate to a short revolving belt, fitted with pockets, and are delivered into a bin above the furnaces. These furnaces are made of iron tubes, one fitted inside the other. The outer one, being several inches larger in diameter than the inner, is supported by means of brackets to the floor and carries in the intervening space between the two tubes a coil of iron pipe, with suitable sized perforations for heating the walls of the inner tube with gas. The inner tube revolves and the hot borings and liquid white metals pass into revolving screens, smaller in mesh than the last classifier, and the liquid white metal escapes through the screen into an outer surrounding vessel, heated by a gas coil. In this way the white metal does not cool, but collects at the bottom and can be run into molds. The clean borings pass along the screen on to a hand truck on wheels and are taken to the foundry, melted, and used for ordinary gun metal castings. Each grade is treated separately.

Good nature will often keep a plant running smoothly and cool when good oil will not.

There is more than one way of getting an education. Preserving and reading catalogues is one way.

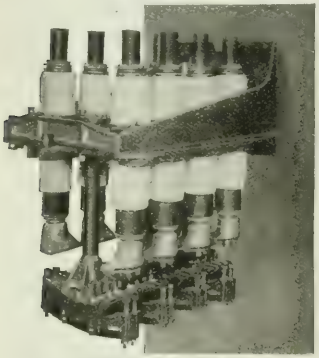
The horsepower of an engine may be increased within the working capacity of the reciprocating parts by increasing the speed or by increasing the steam pressure.

PROGRESS IN NEW EQUIPMENT

A Record of New and Improved Machinery and Accessories for the Machine, Pattern, Boiler and Blacksmith Shops, Planing Mill, Foundry and Power Plant

NEW TYPES OF OIL CIRCUIT BREAKERS

TO its line of type B oil circuit breakers, the Westinghouse Electric & Mfg. Co. of East Pittsburgh, Pa., has added the two types of breakers illustrated. These are designated as type B-2 and B-3; they are for use on alternating current circuits up to 23,000 volts. Type B-2 breakers have a carrying capacity of from 300 to 2,000 amperes; type B-3 of from 300 to 1,200 amperes. Distinctive features of this line are rigidly clamped porcelain pillar bushings, self-cleaning butt brush contacts, auxiliary arcing contacts and spring-accelerated opening. Due to careful design, these are the most compact single-frame breakers produced.

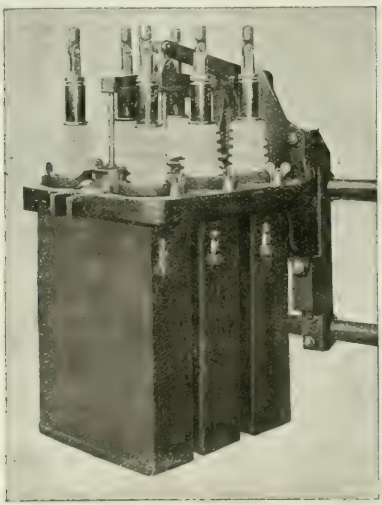


OIL CIRCUIT-BREAKER ARRANGED FOR WALL MOUNTING.

Type B-2 breakers are furnished for panel-mounting, hand operation, or for wall or pipe-frame mounting, electrical operation. Type B-3 breakers are furnished for wall or pipe mounting only, for hand operation through bell cranks, or for electrical operation. For both types, tripping may be either automatic or by hand. Hand-operated breakers are actuated by a handle projecting through a cover-plate on which is mounted the automatic trip coil (if any). When the breaker is electrically operated, the trip coil is mounted on the face of the panel. Remote control breakers operated by bell cranks and rods are provided with a spring to assist the force of gravity in opening. A dashpot brings the moving parts to rest without shock.

When pressure is brought to bear on the main contracts, as the breaker closes, the bent copper leaves of the moving members wipe across the plane stationary contacts, thus ensuring a solid metal-to-metal contact. Arcing contacts consist of a copper-tipped spring plunger mounted on the moving element, which bears on a copper stud on the fixed element. Since this contact is outside the main contacts, the arc is forced away from the latter. Full rated current can be carried by the circuit breakers continuously with a maximum temperature rise of conducting details of 30 deg. C., above atmosphere; of coils, 50 deg. C., and of all other parts not greater than 50 deg. C.

Tanks are of lap-welded sheet steel, lined with micarta and allow ample space for oil and air above the contacts.



OIL CIRCUIT-BREAKER ARRANGED FOR PIPE MOUNTING.

Type B-3 breakers are provided with specially designed baffled vents. These circuit-breakers are furnished for single-throw service only. Where double-throw service is required, two breakers are arranged to interlock so that they cannot be closed simultaneously.

The following other auxiliaries can be furnished:

For hand operated breakers, under-voltage trip device of the self-resetting type; underload trip; shunt or overvoltage trip; signal switches for use in connection with signal lamps, bell alarm attachment, mechanical interlocks for interlocking a pair of breakers; and for automatic hand operated breakers, inverse-time element dash pots and direct-trip attachments.

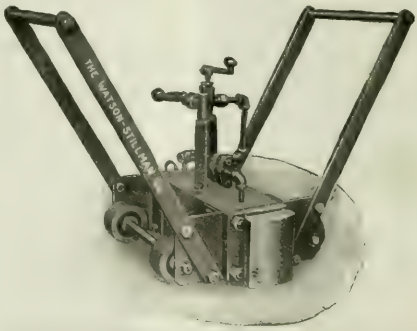
HYDRAULIC BENDER FOR SHIP FRAMES

A NEW design of bender for handling heavy steel shapes for ship frames, deck beams, etc., has just been brought out by the Watson-Stillman Co., New York. It is compactly arranged and is built as light as is consistent with the work it is intended to do.

The machine consists of a cylinder, ram and operating valve, mounted on broad rollers, with a handle on each side so that it can be moved quickly to the required positions on the bending slab, thus making it possible to bend long members to template without reheating and with a minimum of labor.

The necessary resistance of the cylinder is obtained by means of a loose pin which fits into the holes in the bending slabs and serves as an abutment for the machine. The ram is double acting, and its movement is under perfect control at all times, both forward and returning; provision is also made to prevent overstroke.

As illustrated, the machine is equip-



HYDRAULIC BENDER FOR SHIP FRAMES, BEAMS, ETC.

ped with a screw stem stop and release valve; a single lever operating can, however, be furnished if preferred. Any suitable pump can be used as a source of power supply, although accumulator service is preferable. The movement of the machine as shown is at right angles to the axis of the ram, but can also be arranged parallel to it.

The stroke of the ram is 10 in., and with a working pressure of 1,500 lbs. per square inch exerts a force of 18 tons, which can be increased to 20 tons, with 1,750 lbs. per square inch. The weight of the apparatus is 750 lbs.

FOUNDRY AND MACHINE SHOP EQUIPMENT EXHIBITION

THE list of firms who had reserved space up to July 31 for the Foundry and Machine Shop Equipment Exhibition, from September 25 to 28, is both large and important, and gives every indication that when the opening date is reached there will be found in the Mechanics' Building, Boston, Mass., the biggest and most valuable display that has yet taken place in the history of the Institution. The list of reservations follows:—

Abell-Howe Co. ..... Chicago
Ajax Metal Co ..... Philadelphia, Pa.
Albany Sand & Supply Co. ..... Albany, N.Y.
American Foundry Equipment Co. . Cleveland, Ohio
American Gum Products Co. ..... New York
American Lighting Co ..... Chicago
American Molding Machine Co. . Terre Haute, Ind.
American Pipe Bending Mach. Co. . Boston, Mass.
Arcade Mfg. Co. ..... Freeport, Ill.
Armstrong Cork & Insulation Co. . Pittsburgh, Pa.
Atkins & Co., E. C. ..... Indianapolis, Ind.
Athol Machine Co. ..... Athol, Mass.
Ayer & Lord Tie Co. ..... Chicago

B. & B. Mfg. Co. ..... Indianapolis, Ind.
Beaudry & Co., Inc ..... Boston, Mass.
Berkshire Mfg. Co. ..... Cleveland, Ohio
Besly & Co., Chas. H. ..... Chicago
Birkenstein & Sons, S. ..... Chicago
Blystone Mfg. Co. ..... Cambridge Springs, Pa.
Brass World Publishing Co. ..... New York
Bridgeport Safety Emery Wheel Co. Bridgeport, Conn.
Brown Specialty Machinery Co. ..... Chicago
Buckeye Products Co. ..... Cincinnati, Ohio
Bullard Machine Tool Co. ..... Bridgeport, Conn.

Carborundum Co. ..... Niagara Falls, N.Y.
Cataract Refining & Mfg. Co ..... Buffalo, N.Y.
Chase, Frank D ..... Chicago
Champion Foundry & Machine Co ..... Chicago
Chicago Pneumatic Tool Co ..... Chicago
Chisholm-Moore Mfg. Co ..... Cleveland, Ohio
Cincinnati Pulley Machinery Co. . Cincinnati, Ohio
Clark, Charles J. ..... Chicago
Cleveland Blow Pipe & Mfg. Co. . Cleveland, Ohio
Cleveland Milling Machine Co. .... Cleveland, Ohio
Cleveland Pneumatic Tool Co. .... Cleveland, Ohio
Coale Lumber Co., Thos. E. ..... Philadelphia, Pa.
Curtis Pneumatic Machinery Co. .... St. Louis, Mo.
Cutter & Wood Supply Co. ..... Boston, Mass.

Davis-Bournonville Co ..... Jersey City, N.J.
Debevoise-Anderson Co ..... New York
Dixon Crucible Co., Joseph ..... Jersey City, N.J.
Drouve Co., G. ..... Bridgeport, Conn.

Federal Foundry Supply Co ..... Cleveland, Ohio
Felt & Tarrant Mfg. Co ..... Chicago
Forbes & Myers ..... Worcester, Mass.
Foreign Crucibles Corporation ..... New York
Foundry Equipment Co ..... Cleveland, Ohio

Gardner Machine Co ..... Beloit, Wis.
General Electric Co. ..... Schenectady, N.Y.
General Fire Extinguisher Co. ..... Providence, R.I.
Goldschmidt Thermit Co ..... New York
Great Western Mfg. Co. ..... Leavenworth, Kan.

Harrison Supply Co ..... Boston, Mass.
Heap & May Co ..... Henrietta, N.Y.
Herman Pneumatic Machine Co. ..... Pittsburgh, Pa.
Hill, Clarke & Co ..... Boston, Mass.
Hoover Manufacturing Corporation ..... New York
Holz, Herman A. ..... New York

International Molding Mach. Co ..... Chicago
Iron Age, The ..... New York
Jennison-Wright Co ..... Toledo, Ohio

Kellogg, Spencer, & Sons, Inc. ..... Buffalo, N.Y.
Kelly, T. P., & Co., Inc. ..... New York
King, Julius, Optical Co. ..... Chicago
Lees-Bradner Co. ..... Cleveland, Ohio
Lupton's Sons Co., David ..... Philadelphia, Pa.
Lynd-Farquhar Co. ..... Boston, Mass.
McCrosky Reamer Co. ..... Meadville, Pa.
McLain's System, Inc. ..... Milwaukee, Wis.
MacLean Publishing Co. ..... Toronto, Ont.
Malleable Iron Fittings Co. ..... Brantford, Conn.
Metal Industry ..... New York
Michigan Smelting & Refining Co. . Detroit, Mich.
Midland Machine Co. ..... Detroit, Mich.
Moltrup Steel Products Co. .... Beaver Falls, Pa.
Monarch Engineering & Mfg. Co. . Baltimore, Md.
Mott Sand Blast Mfg. Co ..... New York
E. H. Mumford Co. ..... Elizabeth, N.J.
Mumford Molding Machine Co. ..... Chicago
Mahr Mfg. Co. ..... Minneapolis, Minn.

National Engineering Co. ..... Chicago
New England Coal & Coke Co. ..... Boston, Mass.
New Haven Sand Blast Co. ..... New Haven, Conn.
Wm. H. Nichols Co. ..... Brooklyn, N.Y.
Norma Co. of America ..... New York
Norton Co. ..... Worcester, Mass.

Obermayer Co., S. ..... Chicago
Osborn Mfg. Co. ..... Cleveland, Ohio
Oxweld Acetylene Co. ..... Newark, N.J.

Pangborn Corporation ..... Hagerstown, Md.
Paxson Co., J. W. ..... Philadelphia, Pa.
Penton Publishing Co. ..... Cleveland, Ohio
Pickands, Brown & Co. ..... Chicago
Pittsburgh Crushed Steel Co. ..... Pittsburgh, Pa.
Portage Silica Co. ..... Youngstown, O.
Pridemore, Henry E., Inc. ..... Chicago
Quigley Furnace Specialties Co. ..... New York
Railway Mechanical Engineer ..... New York
Richey, Browne & Donald, Inc. .... Maspeth, N.Y.
Rivett Lathe & Grinder Co. Brighton, Boston, Mass.
Robeson Process Co. ..... New York
Rogers, Brown & Co. ..... Cincinnati, Ohio
Sand Mixing Machine Co. ..... New York
Shepard Electric Crane & Hoist Co. Montour Falls, N.Y.
Simonds Mfg. Co. ..... Fitchburg, Mass.
Sly Mfg. Co., W. W. ..... Cleveland, Ohio
Smith & Sons Co., R. P. ..... Chicago
Smith Co., Warner G. ..... Cleveland, Ohio
Standard Equipment Co. ..... New Haven, Conn.
Sterling Wheelbarrow Co. ..... West Allis, Wis.
Strong, Kennard & Nutt Co. ..... Cleveland, Ohio
Sullivan Machinery Co. ..... Chicago
Thomas Iron Co. ..... Boston, Mass.
Titanium Alloy Mfg. Co. .... Niagara Falls, N.Y.
United States Graphite Co. ..... Saginaw, Mich.
U.S. Molding Machine Co. ..... Cleveland, Ohio
United States Silica Co. ..... Chicago
Wallace & Co., J. D. ..... Chicago
Warner & Swasey Co. ..... Cleveland, Ohio
Wheeler & Holcomb Co. ..... Chicago
White & Bro. ..... Philadelphia, Pa.
Whitehead Bros. Co. ..... Providence, R.I.
Whiting Foundry Equipment Co. .... Harvey, Ill.
Woodison, E. J., Co. ..... Detroit, Mich.
Wood's Sons Co., T. B. ..... Chambersburg, Pa.

Moulding Range Top Plate Query — We have experienced considerable trouble in moulding range top plates. The size of these plates is 20 in. by 22 in., weight 47 lbs., thickness of outer edge 3-16 in., inner part ¾ in., with 1 in. flange on bottom all the way round at about ½ in. from the edge. There are also four braces across the bottom. Our trouble is to get a smooth surface on top for polishing. We have found better satisfaction in moulding it top side down. We pour the metal as hot as possible and at times get a very fair surface. At other times, however, we get a very rough or pebbly surface, and sometimes small slag holes. We are using No. 1 Albany sand and have tried a number of different styles of gates. We have also tried sea coal facing without securing the desired results. Suggestions as to remedy of the trouble are invited. H Z F

Screenings

Willis—"Bump has a very up-to-date office."

Gillis—"Yes. He has one of these office systems where you can find just what you want when you don't want it by looking where it wouldn't be if you did want it."

Mrs. Casey—"Me sister writes me that every bottle in that box we sent her was broken. Are ye sure yez printed 'This side up, with care on it!'"

Casey—"Oi am. An' for fear they shouldn't see it on the top. Oi printed on the bottom as well."

Did Not Wish To Offend—"John," said Mrs. Mellen to her man servant, "Can you find out, without asking the cook, whether the tinned salmon was all eaten last night? You see, I don't wish to ask her, because she may have eaten it, and then she would feel uncomfortable."

"If you please, ma'am," replied the man, "the new cook has eaten the tinned salmon, and if you was to say anything to her you couldn't make her feel any more uncomfortable than she is.

Sandy McNab, being a popular and well-known member of the village kirk, was asked by the minister to canvass the other members on behalf of a war charity he was interested in.

Soon afterwards the minister met Sandy walking irresolutely along the road, and at once guessed the cause.

"Man, Sandy," he said earnestly, "I'm sorry to see you in this state."

"Ah, weel, it's for the good of the cause," replied the deliquent quite happily. "You see, meenister, it's through these subscreeptions. I've been down the glen collectin' fun's, an' at every hoose they made me hae a wee drappie."

"Every house! But—but—but surely Sandy, there are some of the kirk members who are teetotallers?"

"Aye, there are; but I wrote tae those."

The man stammered painfully as he stood in the dock at the police court. His name was Sissons, and it was very difficult to pronounce.

He had had the misfortune to stay out late and make an uproar the previous night, so that he had to account for it before the magistrate next morning.

"What is your name?" asked the magistrate.

Sissons began to reply.

"Stop that noise and tell me your name," said the magistrate testily.

"That will do," growled the magistrate severely. "Constable, what is this man charged with?"

"Yer worship, I think he's charged with sodywather," replied the policeman earnestly.

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EFFICIENCY COMPARISON OF INDIVIDUALS.

THE term "efficiency" is becoming so commonplace that it is often difficult to determine whether its application and value are over-estimated or abused. Efficiency can seldom, if ever, be maintained at a certain fixed standard, even where the mechanical factors have an apparently pre-determined and unalterable rating. The useful work of any piece of mechanism must necessarily be of a variable character, dependent upon the changing conditions incidental to its operation and maintenance. In calculating the effective output of any machine, it is necessary to take into account the human factor, and this at best, will vary in different groups of workmen, besides having an individually fluctuating value.

In the manipulation of metal working units, the practice has been to speed up the actual cutting operations, made possible by the increased "efficiency" of the cutting tools and the better adaptation of the equipment upon which the work is performed. Viewed from the mechanical standpoint, this feature of modern engineering practice has more than held its place in the evolution towards maximum efficiency; but while the output of a certain machine may show exceptionally good records under the operation of one workman, the results from another workman, apparently equal in mechanical ability, may show a pronounced decrease. Close observation will possibly detect little difference in the time consumed in the actual machining operation, as once the tools are set and the machine working, the human factor is little more than a spectator; but it is the period of preparation between cuts and the necessary changing and setting of tools, feeds and speeds, that causes the fluctuations in the "efficiency" indicator.

It is often interesting to note the actions of two workmen employed on similar machines and performing the same operation. One man will apparently accomplish his purpose with little or no physical or mental effort, while the other will appear to be nervous and excited, wasting his energies in unnecessary and useless movements, in the hunt for tools and the setting of the same. Carelessness or thoughtlessness, or both, in many instances, is the root cause of the latter's inefficiency, as such workmen are often so occupied with the performance of the machine as to overlook the importance of the time that may be wasted between operations.

The standardizing of efficiency is probably an impossible undertaking but much could undoubtedly be accomplished towards this end by the shop management paying additional attention to such details as the installation of inexpensive accessory equipment, the arrangement of which would facilitate the production of the work by minimizing the time occupied by the unproductive but none-the-less essential preparation requirements. Individual machine tool racks, cupboards, belt shifters, change gear boxes, wrenches, etc., should, wherever possible, be placed in relatively the same position to the operator on each machine. Where no systematic method is adopted, each workman will arrange his surroundings to suit his own convenience, which in a large number of instances are haphazard and, in plants where changes are continually taking place, there develops the tendency to carelessness and untidiness. On the other hand, if the workshop is surrounded and otherwise infused with the atmosphere of neatness and regularity, the employes will naturally be influenced by the uplifting environment, and work in closer harmony with existing conditions. Men will readily adapt themselves to changed conditions especially if these are of a uniformly improving character, and by inaugurating a system that would lessen the tendency to habitual and unnecessary movement on the part of the operators, particularly on groups of similar machines, there would eventually result the establishment of a higher degree of both individual and therefore collective efficiency.

THE U.S. STEEL EMBARGO

ADVICE to the Canadian Government of date August 8, by the Department of Commerce, Washington, states that an embargo on steel for shipbuilding purposes will become absolutely effective on August 15, and that, thereafter, all iron and steel products leaving the United States must do so under special license. While it is not believed that the restraint will militate harshly as regards our munitions requirements, nor too much so against those of our steel shipbuilding programme, there is little doubt but that Canadian consumers of steel for general manufacturing purposes will be more or less hard hit. Due to our steel mills having their capacity output under contract to the Imperial Munitions Board, consumer requirements for other than war needs have for many months been dependent on United States mills.

Whether the very material reduction that has taken place and is still operative relative to the number of plants engaged in the machining of shell will extend to the activities of our steel mills as well at an early date, is not at the moment clear. When account is taken, however, of the fact that the U.S. steel embargo is expressive of that country's determination to utilize her resources to the fullest possible extent in the production of munitions and other war material, and that the enormous expenditure of shell in recent weeks in France and Flanders only reduced Britain's supply of filled shell by some 7 per cent., it is not improbable that at a quite early date not only will our shell industry as regards its machining feature have practically disappeared, but the steel requirements for shipment either as such, or as forgings, may have shrunk to somewhat insignificant proportions. Diagnose the situation as we may, conclusion that the ebbing of our shell industry has been gathering impetus since we drew attention to it three or four months ago, remains, and it will be the part of wisdom of those involved, to keep pace with it in one or other compensating direction. The lack of "bottoms" to carry our steel and finished shell products across the ocean should, in addition, not be overlooked.

INDUSTRIAL NOTABILITIES

THOMAS PALMER HOWARD, managing director, Phoenix Bridge & Iron Works, Ltd., Montreal; vice-president, Structural Engineering Co., Ltd., Montreal; director, Canada Envelope Co., Ltd., Montreal; 2nd vice-president, Canadian Manufacturers' Association, 1917-1918, was born and educated at Montreal, Que. He was born Aug. 17, 1869, son of Capt. Thomas and Gertrude Howard, and received his education in High School and Montreal Business College.

THOMAS PALMER HOWARD

His business career commenced in 1886 when he entered the service of the Grand Trunk Ry. Co.; at a later date being with the Park Steel Co., Montreal. In 1895 he joined James W. Pyke & Co., and in 1898 organized present Co., and has been in charge of same ever since.

His activities in connection with the Canadian Manufacturers' Association have been featured by membership of Executive Council for Canada since 1909, and was chairman of the Montreal section, 1913-1914.

Mr. Howard holds a lieutenancy in the 1st Regiment Reserve, Montreal Home Guards and his club membership includes—Canada, Engineers', Manitou; Kaneron Fish and Game; Montreal Curling. He is Independent in politics and is Anglican in creed.

On Nov. 26, 1903, he married E. Daisy Taylor and has two sons, the family residence being at 4189 Avenue Road, Westmount, Que.

—Photo, Courtesy British and Colonial Press.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON.

Grey forge, Pittsburgh	$47 95	
Lake Superior, charcoal, Chicago	58 00	
Standard low phos., Philadelphia	87 00	
Bessemer, Pittsburgh	55 95	
Basic, Valley furnace	53 00	
	Montreal	Toronto
Hamilton	.....	.....
Victoria	.....	.....

FINISHED IRON AND STEEL.

Per lb. to Large Buyers.	Cents
Iron bars, base, Toronto	5 25
Steel bars, base, Toronto	5 50
Steel bars, 2 in. to 4 in. base	6 00
Steel bars, 4 in. and larger base	7 00
Iron bars, base, Montreal	5 25
Steel bars, base, Montreal	5 50
Reinforcing bars, base	5 25
Steel hoops	7 50
Refined iron	5 50
Norway iron	11 00
Tire steel	5 50
Spring steel	7 00
Band steel, No. 10 gauge	5 75
Chequered floor plate, 3-16 in.	12 10
Chequered floor plate, ¼ in.	12 00
Staybolt iron	8 50
Bessemer rails, heavy, at mill	38 00
Steel bars, Pittsburgh	4 50
Tank plates, Pittsburgh	9 00
Structural shapes, Pittsburgh	4 50
Steel hoops, Pittsburgh	5 25
F.O.B. Toronto Warehouse.	
Steel bars	5 50
Small shapes	5 75
F.O.B. Chicago Warehouse	
Steel bars	5 00
Structural shapes	5 00
Plates	8 50

FREIGHT RATES.

Pittsburgh to Following Points

	Per 100 lbs. C.L.	L.C.L.
Montreal	23.1	31.5
St. John, N.B.	35.1	45.5
Halifax	35.1	45.5
Toronto	18.9	22 1
Guelph	18.9	22 1
London	18.9	22.1
Windsor	18.9	22.1
Winnipeg	64.9	85.1

METALS.

	Montreal	Toronto
Lake copper	$34 00	$35 00
Electro copper	34 00	35 00
Castings, copper	33 00	34 00
Tin	62 00	63 00
Spelter	11 00	11 00
Lead	13 50	13 00
Antimony	20 00	20 00
Aluminum	65 00	64 00

Prices per 100 lbs.

PLATES.

	Montreal	Toronto
Plates, ¼ to ½	$12 00	$12 00
Heads	12 30	12 30
Tank plates, 3-16 in.	12 65	12 25

WROUGHT PIPE.

Effective July 5, 1917.

Standard Buttweld.

Size.	Black (Per 100 feet)	Galvanized
⅛ in.	$ 5 00	$ 6 50
¼ and ⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 23
3½ in.	69 92	86 94
4 in.	82 84	103 00

Standard Lapweld.

2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8 L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10 L in.	256 00	320 00
10 in.	329 60	412 00

Prices—Ontario, Quebec and Maritime Provinces.

WROUGHT NIPPLES.

4" and under, 45%.

4½" and larger, 40%.

4" and under, running thread, 25%.

Standard couplings, 4" and under, 35%.

4½" and larger, 15%.

OLD MATERIAL.

Dealers' Buying Prices.

	Montreal	Toronto
Copper, light	$23 00	$22 00
Copper, crucible	26 00	27 00
Copper, heavy	26 00	26 50
Copper wire	26 00	26 50
No. 1 machine composition	20 00	22 00
New brass turnings	16 00	19 00
No. 1 brass turnings	14 00	16 00
Light brass	12 00	10 50
Medium brass	16 00	16 00
Heavy brass	18 00	18 00
Heavy melting steel	21 00	17 00
Steel turnings	11 00	8 00
Shell turnings	12 00	12 00
Boiler plate	18 00	10 50
Axles, wrought iron	25 00	24 00
Rails	20 00	18 00
No. 1 machine cast iron	27 00	25 00
Malleable scrap	20 00	20 00
Pipe, wrought	19 00	9 00
Car wheels, iron	26 00	25 00
Steel axles	29 00	30 00
Mach. shop turn'gs.	8 50	8 50
Cast borings	12 00	8 50
Stove plate	19 00	19 00
Scrap zinc	8 00	9 50
Heavy lead	11 00	10 75
Tea lead	7 00	7 00
Aluminum	35 00	35 00

BOLTS, NUTS AND SCREWS.

	Per Cent.
Carriage bolts, ⅝" and less.	10
Carriage bolts 7-16 and up.	net
Coach and lag screws	25
Stove bolts	55
Plate washers	List plus 10
Machine bolts, 7-16 and over	net
Machine bolts, ⅜ and less	10
Blank bolts	net
Bolt ends	net
Elevator bolts	50 and 5
Machine screws, fl. and rd. hd., steel	27½
Machine screws, o. and fil. hd., steel	10
Machine screws, fl. and rd. hd., brass	add 20
Machine screws, o. and fil. hd., brass	add 25
Nuts, square blank	add $1 50
Nuts, square, tapped	add 1 75
Nuts, hex. blank	add 1 75
Nuts, hex. tapped	add 2 00
Copper rivets and burrs, list plus	30
Burrs only list plus	50
Iron rivets and burrs	17½
Boiler rivets, base ¾-in and larger	$7 60
Structural rivets, as above	7 50
Wood screws, flat, bright	.72½
Wood screws, O. & R., bright	.67½
Wood screws, flat, brass	.37½
Wood screws, O. & R., brass	.32½
Wood screws, flat, bronze	.27½
Wood screws, O. & R., bronze	.25

MILLED PRODUCTS.

	Per cent.
Set screws	35
Sq. & Hex. Head Cap Screws	30
Rd. & Fil Head Cap Screws	10
Flat ⅞ But. Hd. Cap Screws plus	10
Fin. & Semi-fin. nuts up to 1 in.	25
Fin. and semi-fin. nuts, over 1 in., up to 1½ in.	30
Fin. and semi-fin. nuts, over 1½ in., up to 2 in.	10
Studs	20
Taper pins	40
Coupling bolts, plus	10
Planer head bolts, without fillet, list plus	10
Planer head bolts, with fillet, list plus 10 and	10
Planer head bolt nuts, same as finished nuts.	
Planer bolt washers	net
Hollow set screws...list plus	20
Collar screws ....list plus 30,	10
Thumb screws	20
Thumb nuts	65
Patch bolts .... add 40,	10
Cold pressed nuts to 1½ in.	add $4.50
Cold pressed nuts over 1½ in.	add $7.00

BILLETS.

	Per gross ton
Bessemer billets	$90 00
Open-hearth billets	90 00
O.H. sheet bars	90 00
Forging billets	125 00
Wire rods	95 00

F.o.b. Pittsburgh.

NAILS AND SPIKES.

Wire nails	5 50	5 45
Cut nails	5 70	5 80
Miscellaneous wire nails		60%
Spikes, ⅜ in. and larger		7 50
Spikes, ¼ and 5-16 in.		8 00

MISCELLANEOUS.

Solder, strictly	0 38
Solder, guaranteed	0 41
Babbitt metals	16 to 65
Soldering coppers, lb.	0 53
Lead wool, per lb.	0 15
Putty, 100-lb. drum	4 35
White lead, pure, cwt.	19 00
Red dry lead, 100-lb. kegs, per cwt.	15 45
Glue, English	0 38
Tarred slaters' paper, roll	0 95
Gasoline, per gal., bulk	0 31½
Benzine, per gal., bulk	0 30½
Pure turpentine, single bbls., gal.	0 60
Linseed oil, raw, single, bbls.	1 27
Linseed oil, boiled, single bbls.	1 30
Plaster of Paris, per bbl.	2 50
Sandpaper, B. & A. ..list plus	20
Emery Cloth .....list plus	33 1-3
Borax, cyrstal	15
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 03
Rosin "G," per lb.	0 03½
Borax crystal and granular	0 15
Wood alcohol, per gallon	2 15
Whiting, plain, per 100 lbs.	2 20

ROPE AND PACKINGS

Plumbers' oakum, per lb.	.09
Packing, square braided	.34
Packing, No. 1 Italian	.40
Packing, No. 2 Italian	.32
Pure Manila rope	.37
British Manila Rope	.31
New Zealand Hemp	.31
Transmission rope, Manila	.43
Drilling cables, Manila	.39
Cotton Rope, ¼-in. and up	.47

POLISHED DRILL ROD.

Discount off list, Montreal and Toronto 25%

CARBON DRILLS AND REAMERS.

	Per Cent.
S.S. drills, wire sizes up to 52	40
S.S. drills, wire sizes, No. 53 to 80	25
Standard drills to 1½ in.	40
Standard drills, over 1½ in.	15
3-fluted drills, plus	10
Jobbers' and letter sizes	40
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	40
Sleeves	40
Taper pin reamers	20
Drills and countersinks ... list plus	30
Bridge reamers	45
Centre reamers	10
Chucking reamers	10
Hand reamers	15

COLD ROLLED SHAFTING.

At mill .... list plus 40%

At warehouse...... list plus 50%

Discounts off new list. Warehouse price at Montreal and Toronto.

IRON PIPE FITTINGS.

Canadian malleable, A, add 7½%; B and C, 10%; cast iron, 35%; standard bushings, 50%; headers, 60; flanged unions, 40; malleable bushings, 50; nipples, 55; malleable lipped unions, 50.

SHEETS.

	Montreal	Toronto
Sheets, black, No. 28	$11 00	$11 00
Sheets, black, No. 10	11 50	11 50
Canada plates, dull, 52 sheets	11 00	11 00
Canada plates, all bright	12 50	12 50
Apollo brand, 10¾ oz. galvanized	12 25	12 09
Queen's Head, 28 B.W.G	11 75	10 75
Fleur-de-Lis, 28 B.W.G.	11 75	10 75
Gorbal's Best, No. 28	12 00	10 25
Colborne Crown, No. 28	11 25	10 00
Premier, No. 28 U.S.	13 75	12 70
Premier, 10¾ oz.	13 85	13 00
Zinc sheets	20 00	20 00

PROOF COIL CHAIN.

B

¼ in.	$12 00
5-16 in.	11 50
⅜ in.	11 15
7-16 in.	10 90
½ in.	10 70
9-16 in.	10 70
⅝ in.	10 50
¾ in.	10 40
@ in.	10 25
1 inch	10 10
Extra for B.B. Chain	1 20
Extra for B.B.B. Chain	1 80

ELECTRIC WELD COIL CHAIN B.B.

⅛ in.	$15 50
3-16 in.	11 70
¼ in.	8 40
5-16 in.	7 40
⅜ in.	6 35
7-16 in.	6 35
½ in.	6 35
⅝ in.	6 35
¾ in.	6 35

Prices per 100 lbs.

FILES AND RASPS.

	Per Cent.
Great Western, American	50
Kearney & Foot, Arcade	50
J. Barton Smith, Eagle	50
McClelland, Globe	50
Whitman & Barnes	50
Black Diamond	40
Delta Files	37½
Nicholson	40
P.H. and Imperial	50
Globe	50
Vulcan	50
Disston	50

COAL AND COKE.

Solvay Foundry Coke	$10 90
Connelsville Foundry Coke	..
Steam Lump Coal	8 50
Best Slack	8 05

Net ton f.o.b. Toronto

BOILER TUBES.

Size.	Seamless	Lap-welded
1 in.	$33 00	....
1¼ in.	36 00	....
1½ in.	38 00	32 00
1¾ in.	38 00	32 00
2 in.	45 00	33 00
2¼ in.	48 00	35 00
2½ in.	50 00	38 00
3 in.	58 00	45 00
3¼ in.	....	53 00
3½ in.	70 00	55 00
4 in.	82 00	67 00

Prices per 100 feet, Montreal and Toronto.

OILS AND COMPOUNDS.

Castor oil, per lb.	40
Royalite, per gal., bulk	16
Palacine	19
Machine oil, per gal.	26½
Black oil, per gal.	13
Cylinder oil, Capital	45½
Cylinder oil, Acme	36½
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	2 50
Union thread cutting oil antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil	11

BELTING—NO. 1 OAK TANNED.

Extra heavy, single and double	30-5%
Standard	40%
Cut leather lacing, No.1	1 50
Leather in sides	1 35

TAPES.

Chesterman Metallic, 50 ft.	$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

WASTE.

White	Cents per lb.
XXX Extra	20
Peerless	20
Grand	19
Superior	19
X L C R	18
Atlas	18
X Empire	18
Ideal	17
X press	16

COLORED.

Lion	14½
Standard	13
No 1	13
Popular	11¾
Keen	10½

WOOL PACKING.

Arrow	25
Axle	20
Anvil	15
Anchor	11

WASHED WIPERS.

Select White	12
Mixed colored	10
Dark colored	09

This list subject to trade discount for quantity.

RUBBER BELTING.

Standard	40%
Best grades	20%

ANODES.

Nickel	50 to 54
Cobalt	1 75 to 2 00
Copper	44 to 46
Tin	49 to 54
Zinc	23 to 25

Prices Per Lb.

COPPER PRODUCTS.

	Montreal	Toronto
Bars, ½ to 2 in.	55 00	53 00
Copper wire, list plus 10.		
Plain sheets, 14 oz., 14x28 in., 14x60 in.	55 00	53 50
Copper sheet, tinned, 14x60, 14 oz.	60 00	54 25
Copper sheet, planished, 14x60 base.	64 00	60 00
Braziers', in sheets, 6x4 base	55 00	52 00

BRASS.

Brass rods, base ½ in to 1 in rd.	0 55
Brass sheets, 8 in. wide, 20 oz.	0 60
Brass tubing, seamless	0 57
Copper tubing, seamless	0 58

PLATING SUPPLIES.

Polishing wheels, felt.	3 00
Polishing wheels, bullneck	1 75
Emery in kegs, American	06
Pumice, ground	05
Emery glue	15 to 20
Tripoli composition	04 to 06
Crocus composition	07 to 08
Emery composition	08 to 09
Rouge, silver	35 to 50
Rouge, powder	30 to 35

Prices Per Lb.

LEAD SHEETS.

	Montreal	Toronto
Sheets, 3 lbs sq. ft.	$18 00	$18 00
Sheets, 3½ lbs. sq ft	18 00	18 00
Sheets, 4 to 6 lbs. sq ft	17 50	17 50

Cut sheets, ½c per lb. extra.

Cut sheets to size, 1c per lb extra.

PLATING CHEMICALS.

Acid, boracic	$ 15
Acid, hydrochloric	05
Acid, hydrofluoric	14½
Acid, nitric	10
Acid, sulphuric	05
Ammonia, aqua	08
Ammonium carbonate	15
Ammonium chloride	.11
Ammonium hydrosulphuret	.40
Ammonium sulphate	07
Arsenic, white	.12
Copper, carbonate, anhy.	.35
Copper, sulphate	.17
Cobalt sulphate	70
Iron perchloride	20
Lead acetate	.16
Nickel ammonium sulphate	.12
Nickel carbonate	.35
Nickel sulphate	15
Potassium carbonate	.75
Potassium sulphide (substitute)	.26
Silver chloride (per oz.)	.65
Silver nitrate (per oz.)	.65
Sodium bisulphite	.10
Sodium carbonate crystals	.05
Sodium cyanide, 127-130%	.41
Sodium hydrate	.04
Sodium hyposulphite, per 100 lbs.	5.00
Sodium phosphate	.14
Tin chloride	.60
Zinc chloride	.60
Zinc sulphate	.09

Prices Per Lb. Unless Otherwise Stated.

The General Market Condition and Tendency

THE steel situation continues full of interest, but considerable uncertainty prevails in the trade regarding the ultimate trend of prices. Indications point to the crest having been reached, but no definite assurance can be made on this point at the present time, although it appears highly probable that such is the case. The embargo which it is announced will be placed on steel exports from the United States will create a somewhat difficult situation for Canadian consumers and will tend to further restrict private enterprise. Although there is an easier tendency for prices there have been no changes made in the meantime. The declines in semi-finished steel in the States seems to indicate a recession in prices on finished steel products, but the embargo will now have to be taken into consideration. A leading domestic producer of pig-iron has issued a price of $60 per ton on foundry grades, but the market is inactive and consumers continue to hold off pending developments in the price-fixing situation at Washington. A shortage of cars is causing considerable uneasiness, while coke continues to advance, creating a complex condition in the market. Although the pig-iron market is at more or less of a standstill, prices are holding firm. The scrap market is dull with consumers showing little or no interest and buying is largely hand-to-mouth. The fact that prices of scrap are still abnormally high is doubtless tending to restrict buying, particularly as there is a prospect of lower prices. The non-ferrous metals are not much in demand at the present time as consumers are expecting lower prices and are keeping out of the market in the meantime. Continued inactivity may be looked for until some definite announcement has been made in regard to prices. The past week has been a quiet one for machinery dealers, the usual summer dullness prevailing in the market.

Montreal, Que., Aug. 13. 1917.—Every phase of industrial activity appears to reflect the uncertainty that accompanies the delayed action of the American Government in connection with the pending regulations that are to follow the investigations now being made by the various committees into the cost of production of the different commodities required for the prosecution of the war. All steel and metal markets are more or less unsettled as a result of these conditions, and buying has been reduced to the minimum during this period of uncertainty. In some respects it is encouraging to note that a spirit of fairness seems to be the keynote of the President's intention in drafting the new regulations, as it is further impressed upon the trade that the "one price to all" will have far reaching possibilities. Conditions here are indirectly affected by the situation in the States, and the Canadian market is anxiously awaiting further developments. The near approach of conscription and its enforcement tends to disturb the normal trend of events, and the many possibilities that are involved appear to make it more difficult to predict early future conditions. The turn of the tide in iron and steel prices seems to be at hand; this being largely due to the attitude of the American Government during the past few months.

Pig Iron.

Want of interest on the part of consumers has resulted in a comparatively dull market from a buying standpoint, but production proceeds unabated, affected slightly by the summer months. The situation is influenced by the delayed action of the Government and in consequence the market has been very much unsettled. In addition to the possibility of price readjustments in the near future, there is the apparent fact that many consumers are well covered for future requirements. Local dealers report unchanged conditions with Canadian producers still out of the market.

Steel.

The magnitude of the task undertaken by the American Government, in connection with the regulation of prices and sales of war materials, is constantly assuming increased proportions with the result that the market is getting more and more unsettled owing to the uncertainty that is inevitable under such conditions. No definite information appears to the available as to the progress being made by the Investigating Committee, and in consequence the market has developed a pronounced inactivity. The possibility that a decline in steel prices will immediately follow concerted action on the part of the adjusting committees, has placed buyers on their guard, and material is being purchased for immediate needs only. The returning rumor that the "one price to all" may become an actual fact, has added to the tension of the situation. While appearances seem to indicate that steel prices are approaching, if not already at the limit of advance, the ever increasing demand for war materials, especially in the States, makes it very uncertain as to what the future may have in store. While the market in certain grades of unfinished steel is undoubtedly easier, other lines are still retaining their strength. In Pittsburgh district, quotations on billets and sheet bars have declined $10 and $20 per ton for each grade. Forging billets at $125 are $10 lower than last week. Wire rods, Pittsburgh, are now quoted at $95, a decline of $5 per ton. Following a heavy demand for steel rails, the Pittsburgh prices have been advanced $15 and $21 for heavy and light respectively, the quotations being $75 and $82 per ton. Railroad spikes have likewise advanced, the prices quoted being $7.50 and $8 per hundred pounds. A further advance of $1.50 has been placed on ⅜ in. proof coil chain, the quotation being $9 per hundred pounds. Owing to the preference that is given to all Government contracts, the demand for plates for domestic purposes has fallen off considerably, and it is expected to be still less when the full shipbuilding program has been announced. The sheet situation is being influenced by the supposition that the top of the market has been reached and consumers are reluctant to buy under the present uncertain conditions. Wire products are comparatively quiet owing to the fact that this is the middle of the usual dull period. Additional pressure is expected on boiler tube plants to cover the requirements of the marine department in the near future. Local conditions are practically unchanged, but certain readjustments are anticipated; difficulty is still experienced in the transportation of material, due to car shortage.

Metals.

Although the trade still looks upon the early future with optimism, there is a growing belief that the new regulations now in preparation will have a wider influence than previously anticipated, with the result that added uncertainty has been placed on the market. This unsettled condition will remain until definite announcement is made by the American Government. Copper is unsteady and weaker than last week. Tin is more settled and firmer. Spelter is very dull, but necessarily firm. Lead is quieter, but relatively firm. Antimony is inactive, but firm. Aluminum is steady and unchanged.

CANADIAN GOVERNMENT PURCHASING COMMISSION

The following gentlemen constitute the Commission appointed to make all purchases under the Dominion $100,000,000 war appropriation:—George F. Galt, Winnipeg; Hormidas Laporte, Montreal; A. E. Kemp, Toronto. Thomas Hilliard is secretary, and the Commission headquarters are at Ottawa.

Coppers.

The market is a fluctuating one, being influenced by conflicting reports as to the possible changes likely to be enforced by the American Government immediately following the finding and report of the Cost Investigating Committee. Under existing conditions, no heavy buying is expected and what business is passing is only for immediate needs or to cover positive requirements. One of the rulings of the forthcoming regulations appears to be the certainty of the "one price to all" policy, and it is this particular detail that has such a bearing on the current market. Additional strength is noted in the London situation, but the New York market is easier, electro having dropped ½c to 28c per lb., and castings one cent to 27½c per lb. Local quotations are unchanged and firm at 34c for lake and electro, and 33c for castings.

Tin.

The situation in the States has been somewhat relieved by the understanding that no duty will be imposed on tin imports, and this has done much to remove the uncertainty that has marked this market for the past several weeks. Other conditions are still pending that may influence the general situation, and for this reason the market will be more or less unsettled during the investigating period. London and New York are both firmer, the latter having advanced ½c during the week, the quotation being 63¾c per lb. Tin is firm locally at 62c per lb.

Spelter.

The market is exceptionally dull, but continues firm for the apparent reason that any additional weakness would be impossible under present cost of production. This seems to be the only encouraging factor in the present situation, as price regulations based on production costs could not possibly be made at a lower figure than that at present prevailing, in fact, it is generally expected that any adjustment of prices would be to the advantage of producers. New York remains firm at 8⅝c per lb. Local dealers report a quiet market with prices nominal at 11c per lb.

Lead.

The market continues fairly active, but is quieter than last week; production still proceeds at the maximum, but falling off in the demand would be met with a corresponding decrease in production. This market, like all others, is influenced by the delayed action of the American Government and uncertainty will prevail during this period. All New York quotations are on the nominal level of 11c per lb. Local lead is quoted at 13½c with a weak undertone.

Antimony.

This metal continues very quiet and unchanged with prices firm; New York still quotes 15½c, with the local market at last week's level of 20c per lb.

Aluminum.

No material change is noted in the market and the situation is unchanged with prices steady at 65c per lb.

Machine Tools and Supplies.

No new developments have taken place in the machine tool situation and conditions are practically the same as last week. Inquiry has been a little more active, but no improvement has been reported in buying; fair business, however, is noted in general lines, particularly in wood-working machinery and equipment suitable for shipbuilding and accessory manufacture. The American situation is dominated by the war activities, and pressure is being exerted upon certain producers to increase their efforts on behalf of the Government; it is anticipated that the near future may see a material reduction in the building of tools not directly required for essential war requirements. To meet the needs of the situation all arrangements are being made on a co-operative basis, and it is understood that the Government are directly responsible for many of the large additions that are being made to a great number of industries. The market in supplies continues very active, and the situation is marked by firm prices for all commodities; an undertone of uncertainty appears to be

influencing the market as it is anticipated that some readjustment may shortly be made regarding necesary supplies for war requirements.

Scrap.

The market is still unsettled, but a better undertone is apparent. With the attitude of the U. S. Government still a question of uncertainty, the consuming trade has become more active, and this has aided in retaining the market in a comparatively firm position. In the American market the condition of old coppers and brass has shown improvement; aluminum, however, is easier. Local conditions are unchanged, but dealers report more encouraging inquiry; prices are unchanged, but firm.

Toronto, Ont., Aug. 14.—It appears that there is a strong possibility of a shortage of cars in Canada. A large number of foreign cars, which have been for some time in use on Canadian railways, have, it is understood, to be returned to the States. These cars have been largely used for bringing in shipments of coal, with the result that other materials, particularly coke, have been held up. While the coal situation in the meantime has considerably improved, there will have to be a continuation of shipments to keep in the required supply. With fewer cars in service the transportation situation will become more acute. The American Government has not placed an embargo on coal shipments to Canada, as was reported, so there is little fear of trouble on that account. The U. S. Federal Trade Commission is preparing to take over the fuel situation, with power to fix prices and control the trade. This should have a beneficial effect on the Canadian situation.

Steel

Interest in the iron and steel situation continues unabated, and, in fact, has been further intensified by the announcement that an embargo will be placed on the export of steel from the United States to Canada, except on material required for war purposes. While the ultimate effect of this embargo on the situation in Canada is not yet clear, it will no doubt cause considerable inconvenience to the trade, particularly to the merchant and private consumer. The fact that it is unavoidable renders objection to the measure futile, and the consequences will have to be accepted in good grace. Unfortunately for domestic consumers, the mills in this country are filled up with orders, principally for war purposes, for several months, and are thus unable to take care of all the domestic business offering. It remains to be seen if some arrangement cannot be made whereby a proportion of the steel output may be diverted for domestic requirements. The decline in the munitions business may help towards this end. During the past month or so there has been a steady reduction in tonnage of steel imported, due to a falling off in demand occasioned by high prices and difficulty in obtaining material. More recently consumers have been holding off on account of the uncertain outlook created by the American Government price fixing scheme. At the present time the embargo will not affect the situation very seriously, although should prices decline and a buying movement start in, the lack of steel from the States would be felt to greater degree.

There has been no further development in the price fixing situation, and it seems that some weeks may elapse before anything definite materializes. In the meantime the market is at a standstill and the air is full of rumors and predictions regarding the outcome of the Government's deliberations. There is a marked falling off in demand, due partly to the belief that there will be a recession in prices of steel and also because this is a quiet season of the year in the trade. The opinion is gaining ground that only prices on Government requirements will be controlled, and that no attempt will be made to fix prices to the private consumer. There are no price changes to note this week.

MARKET LETTER DEVELOPMENT

The attention of metal working plant executives is directed to the enlargement of the scope and usefulness of our Market Letter Department. In New York and Pittsburgh, expert correspondents have been engaged, and are already furnishing each week concise reports of production activities, price movements, etc., within the territory served by each of these important centres. During the next few weeks, further additions will be made to the number of our United States correspondents, embracing other industrial centres, and enlarging thereby the scope of the meantime service being rendered.

The situation in the black sheet market in the States is unchanged, the Government continuing to dominate the market. New demand from the domestic trade is quiet; the general opinion being that the crest has been reached in prices and that the market will recede before long. Sheet mills are well sold up over the remainder of this year, some having no sheets to offer before next year.

Government action in regard to price fixing continues to dominate the situation in the steel market in the United States, and, while no announcement is expected for some weeks, prices are already showing a tendency to decline. Open-hearth sheet bars have been sold at Pittsburgh at $100 a ton, for rather early delivery, which is $10 below last previous quotation. Bessemer and open hearth billets have also declined $10, and are now quoted at $100 per ton. The U. S. Steel Corporation unfilled orders on hand July 31 amounted to 10,844,164 tons, a decrease of 539,123 tons, compared with the figures for June. The decline reflects the uncertainty in connection with the proposed price fixing policy of the Government.

Pig Iron

The pig iron market continues quiet and the situation generally unchanged. A price of $60 a ton has been given out for "Victoria" foundry iron, but comparatively little business has been closed at that figure. Consumers are marking time waiting developments at Washington. The outlook in the pig iron market is distinctly unfavorable owing to the hight price of coke and shortage of cars. Connellsville coke is now selling at $16 ovens, or an advance of $6 a ton over last week. Buffalo pig iron prices range around $53 to $55 a ton.

Scrap

The scrap market continues in a weak condition. Consumers are buying from hand-to-mouth just to keep them going until the situation improves. Prices are still abnormally high, and a general recession is not unlikely. There are no price changes to note this week.

Machine Tools

Business has been comparatively quiet during the past week, and there are no developments of importance to note. Deliveries continue backward and the situation in this regard is likely to become more acute partly on account of the increased activity in the United States.

Supplies

The character of business in machine shop supplies is gradually getting back to more normal conditions. There has been a falling off in demand from munitions plants, whereas the demand from manufacturing trades is improving. Prices continue very firm, with an upward tendency on many lines. Bearings and hangers have advanced, the new discount being 40 per cent., as against 50 per cent. formerly.

Metals

The metal markets are dull and featureless and little, if any, improvement in the situation is expected until some more or less definite policy has been decided upon by the American Government. In the meantime the markets are marking time and consumers are waiting developments. Buying consequently is not in large volume and prices are unchanged and largely nominal. Business locally continues very good, with indications of an improving demand for metals for general purposes.

Copper.—It is not expected that there will be any marked activity in the copper market until the situation clears up, that is, when the American Government's attitude with regard to prices is known. In the meantime the market is quiet and prices are nominally unchanged. Lake and electrolytic is quoted at 30c. and castings at 30c per pound.

Tin.—The market is dull, there being a lack of buying interest. Consumers are holding off until it is known what action the American Government will

take in regard to prices. Tin is quoted locally unchanged at 63c per pound.

Spelter.—The market is quiet, with practically no interest shown by either buyers or sellers, and no activity is looked for until the intention of the American Government is known as regards the price to be paid on its requirements. The local situation is unchanged at 11c per pound.

Lead.—The situation in the lead market is unchanged, and producers continue to quote 11c New York, regardless of position. The position of lead is a strong one, but the prevailing uncertainty is affecting the market. Lead is unchanged at 13c per pound.

Antimony.—No improvement is noted in the demand for antimony, which has been quiet for some time. The market, however, shows no signs of weakness, and quotations are unchanged at 20c per pound.

Aluminum.—Little interest is being shown in aluminum, and the market is weaker, although quotations are unchanged at 64c per pound.

New York, Aug. 13.—United States Government war orders are now engaging about one-third of the total capacity of the steel plants of the country; some estimates are as high as 40%, taking into consideration the placing of orders to cover the construction of railroad equipment for France and Russia. With the placing of other large orders for ships, artillery and aeroplanes, fully half of the steel mill capacity will be called into the service of the Government, either directly or indirectly. In a few special lines, Government orders are monopolizing nearly full capacity. Few, if any, American manufacturers of ship plate now have any output available for other than Government orders. The recent embargo against exports has checked shipment of hull plate to the Orient, and most of the Japanese shipyards are reported idle and waiting for steel from the United States.

Exigencies of the war have fallen most heavily upon the machinery industry, it being estimated that 80 to 90% of the productive capacity of the largest machine tool makers is now employed on Government work with the prospect that full capacity will be absorbed within a few weeks. Shipbuilders requiring travelling cranes six weeks ago turned to locomotive cranes, and now with capacity of crane builders sold for one year ahead, almost entirely upon Government contracts, the boat builders are resorting to all sorts of expedients to meet their requirements for transmission and conveying machinery.

One of the most interesting developments of the last past week has been the fuller revelation of the Government program to provide the army and navy with adequate artillery. The official and Congressional procrastination of recent years, which has compelled the United States in humility to order ordnance in France and to adopt the English rifle to equip the American army, is to be atoned for at the eleventh hour, in the feverish building of ordnance factories. One contract for three thousand 6-inch guns has been placed with the American Brake Shoe & Foundry Co., to be manufactured at a plant now under construction at Erie, Penn. Four or five similar contracts are virtually understood to have been closed. It is believed that not far from $1,000,000,000 will be spent in the manufacture of heavy artillery.

With Government assistance, new plants will be built by the Niles-Bement-Pond Co., of New York, and by the Gisholt Machine Co., of Madison, Wisconsin, as well as by the Bullard Machine Tool Co., of Bridgeport, Conn., in which to manufacture artillery. The Otis Elevator Co., too, will utilize one of its present factories to build big guns for the army and navy. All of these plants will need machinery. Out of the pressing war needs, too, has been born the Wisconsin Gun Co., which has been formed by five metal-working machinery makers of Milwaukee. The Northwestern Ordnance Co. is the name of the concern organized by the Gisholt Machine Co., to comply with Government request to manufacture artillery.

The Pennsylvania R. R. Co. has issued an additional list of tools to be bought for the United States Army Engineers, who will work upon the railroad system of France. Westinghouse, Church, Kerr & Co. have placed orders for machine tools to be installed at the shell-loading plant of the Rock Island Arsenal; a large percentage of the orders were for wood-working machinery.

The Army Department has placed additional orders for motor trucks, calling for the expenditure of $21,000,000. The contracts include 3,000 Packards, 1,250 Locomobiles and 1,500 Pierce-Arrow trucks. Government motor truck contracts placed thus far amount to $44,000,000, and the Quartermaster at Chicago is now buying 192 light trucks to serve army cantonments, 12 being allotted to each camp.

Airplane manufacturers, because of the difficulty in securing deliveries on machine tools, are utilizing as far as possible the machine shops of the automobile manufacturers which are exceptionally well equipped.

Pittsburgh, Pa., Aug. 11.—The readjustment in prices in the iron and steel market is now fully under way, although it has made little progress as yet. The new development in the past week was a break of $10 to $15 a ton in billet and sheet bar prices, this being the first yielding in unfinished steel prices, while scrap had rounded the turn in June and pig iron in July. Finished steel products are still to be heard from. There is no quotable decline thus far.

The War Industries Board, constituted within the past few days as a subsidiary to the Council of National Defense, will act as purchasing agent for the Government and also for its Allies across the water. The board has made a public statement, expressing allegiance to the principles laid down by President Wilson in his statement published July 12, that there should be no "unusual profits" and that there should be "'one price for all," i.e., the Government, its Allies, and the ordinary domestic buyer. How the board will carry out its program remains to be seen. There is a dark hint in its statement that it is not politic to divulge all its plans. Thus, to the natural tendency of the iron and steel market to readjust itself to a lower and less unreasonable level there is strong pressure from Washington in the direction of lower prices. It is only a question of how soon the readjustment will be completed and how far it will extend.

Decline in Unfinished Steel

The particularly sharp advance in billets and sheet bars occurred in May. The buying of sheet bars was chiefly by sheet consumers who had the bars converted into sheets at mills that had more rolling capacity than steel. Purchases were made up to $105, and $110 was paid in one or two cases, while billets were bought at $95 and $100. In the past week there have been offerings, chiefly by consumers who now have a surplus, of billets at $85, which were not taken, of sheet bars at $90, which were not taken, and of slabs at $90, which were absorbed in small quantities. As scrap started declining in June, pig iron in July and unfinished steel in the past week, finished steel products are next in order. It is the usual sequence when the market begins declining after a great advance.

A Stagnant Market

The stagnation in the market has now lasted about six weeks and there is not the slightest sign of any increase in activity. Scrap is dead, and on account of uncertainties in transportation, freight congestion, embargoes and other deterrent influences, scrap dealers are unwilling to trade even when they have a chance to match sales and purchases. In pig iron there is nothing being done except in very small lots for immediate shipment, at prices a shade lower than formerly ruling. Several lots of Bessemer that had been shipped to seaboard for export have been resold at substantial cuts. Until recently consumers were clamoring for better deliveries on contracts but now it seems to be the other way, some sellers having asked permision to anticipate and being refused.

Stocks and Specifications

Stocks of steel in the hands of jobbers and manufacturing consumers are proving larger than would have been estimated 60 days ago. Jobbers are endeavoring to dispose of surplus stocks, even going out of their regular trade in the effort to do so. The stocks are, of course, poorly distributed. There being plenty of butt weld pipe, for instance, and very little lap weld. Manufacturing consumers as a rule appear to be well provided, although until recently

they were urging mills to make heavier shipments. Some buyers began to curtail their specifications early in June and this curtailment has continued until now, the specifications, against contracts, on the whole, are much less than the shipments. In most lines, however, the mills have specifications enough to run them for many weeks.

Government Control

The Food Control bill was put into final shape last week and has gone through certain formalities this week, being ready to-day for the President's signature. Apart from food it gives the President power to fix prices on coal and coke, either by taking over plants and operating them, decreeing at what prices they shall sell to the public, or establishing a Government agency to handle the material. What course will be followed remains to be seen. One report has it that the moment the President signs the food bill he will sign an order for the Federal Trade Commission to fix prices, but the Commission is on record to the effect that it expects only to make reports as to costs, not to fix any prices at all. Last June the coal operators met in Washington and agreed to limit prices, the schedule being generally $3 per net ton at mine. It is claimed that the operators have been selling at higher prices, while advices from Washington are that $3 is there considered too high. This would suggest that if a price is fixed for coke it will not be over about $5 a ton. The market has been advancing sharply again, and in the past few days some lots of Connellsville furnace coke have sold at as high as $15 per net ton at ovens. Fixing of coke prices would of course tend to soften pig iron.

MARKET FOR OUTPUT OF B.C. MILLS

THE three years of war have witnessed a remarkable development in the pulp and paper manufacturing industry of British Columbia. In 1915, 50,000 tons of paper and 13,000 tons of pulp were produced, and this increased last year to 65,000 tons of paper and 15,000 tons of pulp. These figures will be greatly advanced this year and 1918 will show another increase. The development, however, has all been of recent growth, but appears permanently established. In 1901 the Government commenced granting twenty-one year leases in order to encourage a paper-making industry, with an annual rent of two cents per cord of wood cut. The lessees were bound to build and operate a paper mill of specified capacity. Four companies availed themselves of the provisions and three of these have passed from the hands of the original owners.

The largest corporation is now the Whalen Pulp & Paper Mills, a consolidation of the B. C. Sulphite Fibre Co., the Empire Pulp & Paper Mills, and the Colonial Lumber & Paper Mills. The B. C. Sulphite Fibre Co. has a mill about 25 miles from Vancouver, at Howe Creek, producing about 70 tons of sulphite fibre and employing 300 men. More machinery will presently bring the company's output to 85 tons daily. The Empire Pulp & Paper Mills plant at Swanson Bay is a continuation of the Swanson Bay Forest, Wood Pulp & Lumber Mills, Ltd., and has a capacity of thirty tons of pulp per day. The Colonial Pulp & Paper Mills at Quatsino Sound is having machinery installed for an initial output of sixty tons daily of sulphite fibre.

The Pacific Mills, Ltd., Vancouver, was incorporated in 1915 with a capital of $9,500,000, and took over the defunct Ocean Falls Co. The new company have practically reconstructed the plant and commenced turning out 75 tons of news print daily in May last. By the end of the year the total output will be increased to 195 tons daily.

The Powell River Co. was incorporated in 1911 with a capital of $5,000,000. The mills are at Powell River, and have a daily output of 225 tons of news print, giving employment to 600 men. The Rainy River Pulp & Paper Co. was incorporated this year, taking over a plant previously owned by a company of the same name on Howe Sound. The paid-up capital is $1,000,000. The plant is equipped for the manufacture of Kraft pulp, about twelve tons daily, which will be increased immediately to twenty tons.

The only problem before the British Columbia pulp and paper trade is the obtaining of markets, and this will be considerably solved by the certain depletion of Eastern pulp wood forests and the opening of foreign connections. The local British Columbia market for news print paper amounts to about $250,000 yearly, while a good deal of paper is sent to prairie customers. The United States must continue to be the main market, although an increasing quantity of paper is being sent to Australia, which is depleted of pulp forests, and has relatively poor water powers. Other developing markets for British Columbia paper products are Japan, China, New Zealand, Hawaii, the Philippines, west coast of South America, west coast of Mexico, and Asiatic Russia. Of these Japan is a particularly attractive field, as its yearly imports of paper are over $2,000,000, with about $6,000,000 worth of pulp.

The shearing strength of metals is usually expressed as a percentage of the tensile strength and varies from 38 per cent. for cast iron, to about 84 per cent. for best quality of wrought iron or mild steel, probably a little more in the latter case.

THE scarcity of fuel in Europe has made it commercially feasible to recover coal from the wreck of the English steamer Dorka which went to the bottom off the Danish coast in 1882 with a cargo of coal. So far, 1,000 tons of the mineral have been recovered with considerable profit at present price of coal in Denmark.

DOMINION GOVERNMENT ACQUIRES C.N.R.

THE Canadian Northern Railway System which has been acquired by the Dominion Government will, when co-operating with other Government Systems, materially improve transportation facilities. It is understood that, shortly, a connecting link, 16 miles long, between the Canadian Northern and the National Transcontinental will be built at Long Lake, north-east of Port Arthur, and, when completed, will make the Government System the shortest line between Montreal and Winnipeg. It will also eliminate the back haul in the winter grain trade from the head of the lakes to the Atlantic. It is also expected to have a stimulating effect on wheat, fish and lumber transportation and to aid greatly in keeping Canadian traffic east and west, instead of being diverted south, and lost to the Dominion. The new system to be taken over comprises 9,513 miles under operation, located as follows: In Nova Scotia, 370 miles; in Quebec, 685; in Ontario, 2,022; in Minesota, 215; in Manitoba, 1,995; in Saskatchewan, 2,220; Alberta, 1,266; British Columbia, 540.

Financial Condition

In the latest financial statement of the affairs of the Canadian Northern Railway Co. the surplus of assets over liabilities is given at $39,800,000. Outstanding securities guaranteed by the Dominion Government amount to $104,000,000; those guaranteed by the Provinces to $107,000,000, and those not guaranteed, $147,000,000, a total of $358,000,000. On these the annual interest charges are $14,405,000. Of these interest charges for some years the Dominion Government is directly responsible for $3,000,000 a year and the Provinces for $1,500,000.

The business of the company has shown a remarkable increase during the past three years. For its business year ending June, 1915, the gross earnings were $25,900,000; for 1916, $35,476,000; and for 1917, $42,319,000. For the same years the net earnings were $6,623,000, $9,373,000 and $11,525,000. The Canadian Northern has purchased equipment to the amount of $61,300,000 and paid $46,500,000 leaving a balance owing of $14,800,000. This equipment was estimated by the recent investigating commission to have been worth $56,000,000 and on this depreciation was allowed of $11,000,000, making the value of equipment at pre-war prices, $45,000,000 and estimated at present prices at $85,000,000.

In acquiring the Canadian Northern Railway system the Dominion Government becomes the owner of the largest telegraph company in Canada, the combined Canadian Northern Telegraph Co. and Great North-Western Telegraph Co. There is also added to the Dominion Government's terminal elevator system the largest grain elevator in the world, the Canadian Northern elevator of Port Arthur, with 10,000,000 bushels capacity.

INDUSTRIAL AND CONSTRUCTION NEWS

Establishment or Enlargement of Factories, Mills, Power Plants, Etc.; Construction of Railways, Bridges, Etc.; Municipal Undertakings; Mining News

ENGINEERING

Hamilton, Ont.—F. W. Fearman & Co. will build a cold storage plant to cost $15,000.

Shawinigan Falls, Que.—The Belgo-Canadian Pulp & Paper Co. will probably erect a mill.

Montreal, Que.—Simonds Canada Saw Co. will build an extension to their factory on St. Remi Street.

Ingersoll, Ont.—Fire on August 6 destroyed the hardening department of the Ingersoll Machine Co.'s plant, causing damage estimated at about $2,000. The loss is covered by insurance.

Morrisburg, Ont.—Preparations have already been started on the removal of the machinery at the Morrisburg Tin Plate Works, to Hamilton. The buildings are being demolished.

Port Arthur, Ont.—Good progress is being made with the construction of the Port Arthur Pulp & Paper Co.'s new plant and it is expected that it will be completed by about Sept. 15.

Sault Ste. Marie, Ont.—The International Paper Co., a subsidiary of the Lake Superior Corporation, contemplates erecting a pulp mill on a site adjoining the Algoma Steel Co.'s plant.

Vancouver, B.C.—The Taylor Engineering have been granted a permit to make an addition to the boilerhouse at the B. C. Sugar Refinery. The building will be of reinforced steel and concrete and will cost $9,000.

Vancouver, B.C.—There is a possibility of a galvanizing plant being established here in connection with the wooden shipbuilding industry. A plant is needed to galvanize such materials as boat spikes, drift bolts, etc., used in the construction of wooden ships.

Princeton, B.C.—A large copper company is being financed to build a concentrating mill with three thousand tons daily capacity, at an approximate cost of $2,000,000. The decision to build the mill was encouraged by the results of the flotation test by a mill of fifty tons daily capacity on Copper Mountain. The general manager estimates that the mine contains ten billion tons of reasonably assured ore.

Hamilton, Ont.—Alex. M. Snyder, a former well-known Hamilton man, has returned from Detroit to organize a $5,000,000 corporation, to be known as the Canadian Hession Tiller and Tractors, Ltd. The new company will manufacture a rotary tiller which will be attached to an especially constructed gasoline tractor. The head office of the concern will be located in Toronto, temporarily, with Mr. Snyder as general manager. Mr. Snyder states that Hamilton is being considered as a location for the factory.

ELECTRICAL

London, Ont.—The Public Utilities Commission has purchased a site for the new hydro substation.

Cookstown, Ont.—On August 20 a by-law will be voted on to provide $9,500 for the transmission and supply of electrical power.

Moorefield, Ont.—By-law has been passed and tenders will likely be called shortly for the installation of a hydro electric system.

Cookstown, Ont.—A by-law will be voted on by the ratepayers on Aug. 20, to authorize an expenditure of $9,500 for the transmission and supply of electrical power.

Port Colborne, Ont.—The Board of Trade has set a movement on foot for establishing the Hydro-Electric in Port Colborne. The plan discussed is to have Port Colborne and Humberstone unite unite under one commission and one plant jointly.

MUNICIPAL

Wilkie, Sask.—Improvements to the waterworks system are contemplated by the Town Council.

Swift Current, Sask.—The City Council have passed by-laws for the issuing of debentures for $30,000 and $25,000 for necessary improvements to the electric light and power plant.

Toronto, Ont.—The Ontario Railway Board has decided that the city of Ottawa cannot have a municipal fuel depot, and has refused to approve the by-law discussed at a hearing of Ottawa officials recently.

Windsor, Ont.—By large majorities Windsor ratepayers last Friday defeated two by-laws to authorize debenture issues of $30,000 and $17,000, respectively, to cover the cost of building an Isolation Hospital and a municipal garage.

Winnipeg, Man.—Tenders will be called by the city for a mechanical grate stoker, designed to burn fine dust coal, to be fitted to the 50 horse-power Babcock Wilcox boiler at the municipal power house. It will cost about $1,000.

Smith's Falls, Ont.—A by-law will be submitted to the ratepayers on Aug. 22 to raise $135,000 for the purchase of the electric plants of the Citizen's Electric Co. and the Smith's Fall Electric Power Co., and $67,000 bonus to the Exclusive Ladies' Wear, Ltd., of Montreal.

Winnipeg, Man.—The Auto Parts Co of Milwaukee, Wis., has written to the Board of Trade, stating its desire to open a factory in Winnipeg and asking for particulars regarding power and sites. The communication has been forwarder to the Industrial Bureau.

Hamilton, Ont.—The Civic Board of Works have recommended that the City Council endorse the report of Engineers W. F. Tye and N. Couchon with reference to a common entrance for all railways into the city and that a copy of the report be forwarded to the Dominion Railway Commission as representing the views of the city in the matter of the railway situation in Hamilton.

AUXILIARY MACHINERY REQUIRED.

Tender forms and specifications have been received from D. H. Ross, Canadian Trade Commissioner, Melbourne, for supply and delivery of auxiliary machinery for the Flinders naval base, via Melbourne, Victoria, and are open for inspection at the Department of Trade and Commerce, Ottawa (refer to File No. A-1901). Tenders addressed to the Director of Navy Contracts, Navy Office, Melbourne, close on October 24, 1917. The particulars are as follows:

Two electrically-driven air pumps, with complete set spare parts.

One steam driven air pump, with complete set of spare parts.

Two small circulating pumps.

One large circulating pump.

One large feed pump, with complete set of spare parts.

One small feed pump, with complete set of spare parts.

One oil fuel pump with complete set of spare parts.

GENERAL

Brantford, Ont.—The Kitchen Overall & Shirt Co., Ltd., contemplate the erection of a factory here.

St. Jerome, Que.—The Dominion Rubber Co. will build an extension to their factory here.

Redcliff, Alta.—It is reported that two new industries will probably be established here if the co-operation of the farmers in this district can be obtained.

Hamilton, Ont.—It has been announced that the Canadian branch of the Teguffin Chemical and Manufacturing Co., of Rochester, N.Y., will be located in Hamilton, the old armory rink having been secured for that purpose. The principal product of the company is boiler preservative.

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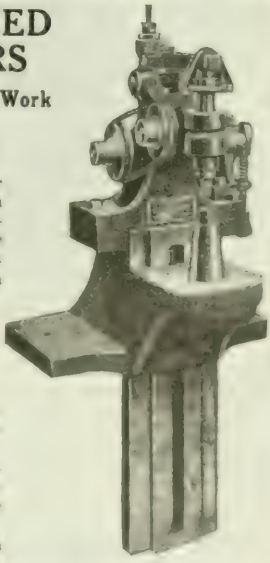

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Sales Agents: The A. R. Williams Machinery Company, Limited, Toronto, Ontario.

If any advertisement interests you, tear it out now and place with letter to be answered

TENDERS

Hamilton, Ont.—Tenders are being received until September 4 by the engineer, E. R. Gray, for pumping equipment for Beach pumping station. The cost is estimated at $130,000.

Toronto, Ont.—Tenders will be received, addressed to the Chairman, Board of Control, City Hall, Toronto, up to noon on Tuesday, August 28, 1917, for the supply and installation of mechanical stokers, at the Main Pumping Station. Specifications and forms of tender may be obtained at the Works Department, Room 12, City Hall.

Winnipeg, Man.—Tenders, addressed to the Chairman, Board of Control, will be received up to Friday, August 24, 1917, for the supply and complete installation of one mechanical chain grate stoker for the Municipal Hospital Power House, Morley Avenue. Specification and form of tender may be obtained at the office of the City Engineer, 223 James Avenue.

Ottawa, Ont.—Tenders for tungsten lamps for the Departmental Buildings, Ottawa, Ont., will be received until Friday, August 17, 1917. Specification to be seen on application to the Clerk of Works, Postal Station "F," Toronto, to the Overseer, Dom. Bldgs., Central Post Office, Montreal and to the Chief Architect, Department of Public Works, Ottawa.

Toronto, Ont.—Tenders addressed to the Secretary-Treasurer of the Board of Education, will be received until Aug. 24, for completion of carpentry work in Park School New Building, local telephones, cabinet work, repair work in various trades. Specifications may be seen and all information obtained at the office of the Superintendent of Buildings, 155 College Street.

Winnipeg, Man.—Tenders, addressed to the Chairman, Board of Control, will be received up to Wednesday, August 22, 1917, for the following supplies for the Fire Department, namely, 3,000 feet 3½ inch cotton, rubber-lined fire hose, 221 (more or less) pairs rubber boots, 221 (more or less) waterproof coats. Specifications and forms of tender may be obtained at the office of the Chief of the Fire Department, Central Fire Station.

Quebec, Que.—Tenders will be received until Tuesday, August 28, 1917, for the construction of a steel bridge (two spans), over sluice ways in St. Charles River, at Quebec, P.Q. Plans and forms of contract can be seen and specification and forms of tender obtained at the Department of Public Works, Ottawa, and at the offices of the District Engineers, Shaughnessy Building, Montreal, P.Q., Post Office Building, Quebec, P.Q., and Equity Building, Toronto, Ont.

St. John, N.B.—Tenders will be received until August 31, for the construction of an extension of and repairs to the Negro Point breakwater, St. John Harbour, St. John County, N.B. Plans and forms of contract can be seen and specifications and forms of tender obtained at the Department of Public Works, Ottawa, and at the offices of the District Engineers at St. John, N.B.; Halifax, N. S.; Shaughnessy Building, Montreal, P.Q., and Equity Building, Toronto, Ont.

Ottawa, Ont.—Tenders will be received until August 27 for plumbing pipes and fixtures required in the reconstruction of the Parliament Buildings. All tenders to be based on the execution, erection and completion, including all labor and materials required for the installation of the plumbing system, together with all fixtures, apparatus and appliances as called for in the plans and specifications. Plans, specifications and any other information can be obtained at the office of the general contractor, P. Lyall & Sons, Construction Co., Ottawa.

Ottawa, Ont.—By direction of the Hon. the Minister of Militia and Defence, the following Old Stores are for sale by public tender: Leather, old miscellaneous, 5,719 lbs.; rubber, old, 127 lbs.; metal, old brass miscellaneous, 419 lbs.; metal, old, steel, files only, 25 lbs.; metal, old, steel scrap, 339 lbs.; metal, old nickel, 27 lbs.; metal old iron cast, 570 lbs; metal, old iron, wrought, 1,532 lbs.; metal, old copper, 10 lbs.; rags, old linen and cotton, 1,971 lbs.; rags, woollen of sorts, 3 lbs.; rope or cordage, old, 38 lbs.; sheets, ground, 8,500 lbs. These articles may be seen on application to the Senior Ordnance Officer, Toronto, Ont. Sealed tenders for the purchase of all or any of these lots, each addressed to the above-mentioned Officer, the enenvelop to be marked "Tender," will be received until 12 o'clock noon Aug. 17, 1917.

PUMPING EQUIPMENT REQUIRED

Tender forms, specifications and drawings have been received from D. H. Ross, Canadian Trade Commissioner, Melbourne, for the supply and delivery of pumping plant and equipment for the Commonwealth naval dockyard, Cockatoo Island, Sydney, N.S.W., and are open for inspection at the Department of Trade and Commerce, Ottawa (refer to File No. A-1901). Tenders addressed to either the Director of Navy Contracts, Navy Office, Melbourne, or the Director of Naval Contracts, care Commonwealth Naval Dockyard, Cockatoo Island, Sydney, N.S.W., close on October 10, 1917. The particulars are as follows:

Two main dock pumps with vertical spindle motors and control equipments.

One vertical spindle motor and control equipment.

Four sluice valves with four motors and control equipment.

Two drainage pumps with motors and equipment.

Two air exhaust pumps with motors and equipment.

One enclosed motor and equipment for dock caisson.

CONTRACTS

Orillia, Ont.—It is proposed to build an addition to the Orillia Hospital to cost $25,000. A by-law will be submitted to the ratepayers at an early date.

The Laurin & Leitch Construction Co., Montreal, Que., has been awarded the general contract for the erection of a pumping and filtration plant at St. John's, Que.

Port Hope, Ont. — Wells & Gray of Toronto, have been awarded the contract for the erection of $40,000 addition to the plant of the Nicholson File Co., of this town.

London, Ont.—The tender of Noble & Rich has been accepted by the Public Utilities Commission for installing a hot water heating system in the Utilities Building. The contract price is $5,490.

Pointe Claire, Que.—The Town Council have awarded a contract for water filtration plant and lift pumps to Arsenault & Plamondon, Montreal. The contract price was $38,500.

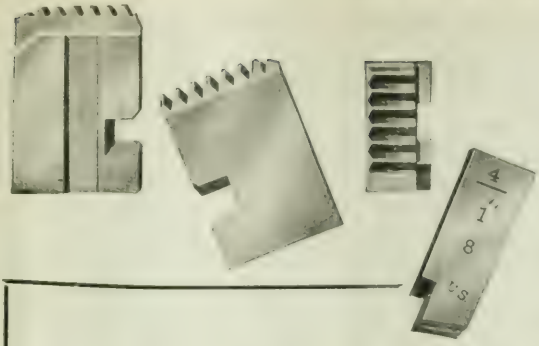
The York Manufacturing Co., York, Pa., have been awarded a contract for a 500 ton ice-making plant and large cold storage for the American Army in France. This is probably the largest single contract of this kind ever let.

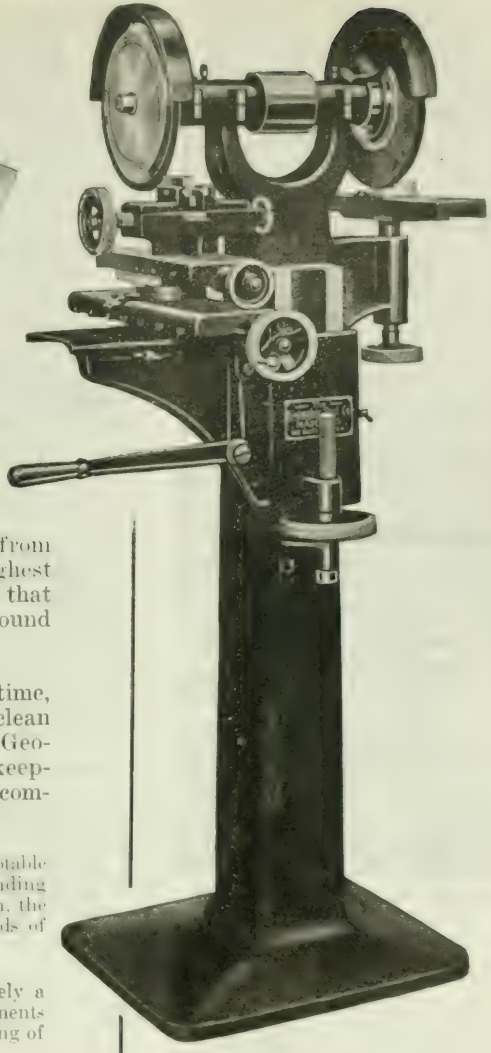
Montreal South, Que.—Julien Toussaint & Cie, of Montreal, has the contract for water mains, valves, hydrants, sewers, and manholes, and the Chicago Bridge and Iron Works, Bridgeburg, Ont., the contract for elevated steel tanks for waterworks, etc., costing $180,000.

Toronto, Ont.—Contracts have been let by the Hydro-Electric Power Commission of Ontario covering the installation of a 4,000 horse-power generator and turbine at the Eugenia Falls development. The installation of this unit will double the present capacity of the plant.

Brantford, Ont.—The firm of P. H. Secord & Son of this city, which has been in charge of the construction of so many schools and other new public buildings in various districts of Northern Ontario, has been awarded the contract for the erection of a new brick school at Dome Mines, Porcupine.

Toronto, Ont.—The Finance Committee of the Board of Education has decided to accept the following tenders: Plumbing at the Duke of Connaught School, L. Legrow, $177; heating at Fern Avenue School, Johnson Heat and Regulation Co., $773; electric wiring at Brown School, Fred Armstrong, $130; electric wiring at Kew Beach School, Canada Electric Co., $631; electric wiring at Duke Street School, A. B. Rice, $437.





Sharp Chasers Cut Clean Threads

Accurate, uniform threads result only from dies which are maintained in the highest state of cutting efficiency. This means that chasers must be kept sharp, and ground uniformly.

Even if just touched up from time to time, the chasers respond splendidly, with clean threads. And with this machine—the Geometric Chaser Grinder—the matter of keeping threading tools up to scratch is a comparatively simple matter.

Any make of chaser can be ground on this adaptable machine. The two wheels permit the easy grinding of both milled and tapped chasers. In addition, the plain wheel lends itself readily to various kinds of tool grinding.

Uniform grinding of a set of chasers is purely a mechanical matter through the use of adjustments which can be accurately set to govern the grinding of an entire set of chasers.

The Catalog describing this machine is a mine of information on chaser grinding. Write for it.

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Few can predict yet all can prepare! Our present prosperity rests in part on an artificial basis which peace must remove. Now is the time to consolidate your position by regulating your expenditures by husbanding the surplus and by investing to the limit in Canadian War Loans, that help so much to maintain present prosperity.

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TRADE GOSSIP

Sterling Irons and Metal, Ltd., has changed its name to that of the Canada Iron and Metals, Ltd.

The Richmond Mfg. Co., Toronto, chuck manufacturers, contemplate removing their business from Toronto and are looking for a suitable location for a factory. W. McNight is manager of the concern.

U. S. Steel Unfilled Tonnage Decrease. The unfilled tonnage of the United States Steel Corporation decreased by 539,123 tons, the monthly report showed. Unfilled orders on hand July 31 totalled 10,844,164 tons, compared with 11,383,287 tons on June 30. The tonnage of unfilled orders was 11,886,591 on May 30; 12,183,083 on April 30, and 9,593,592 on July 31 a year ago.

Tungsten Market Stronger.—While the market for Tungsten has not advanced, the general tone is stronger and the tendency is towards higher prices. Wolframite tungsten is quoted at $23 and upawrds, and Scheelite at $26, New York; acording to quality. Imports into the U. S. have been heavier than expected ,but have been readily absorbed.

Crude Oil at Record Price.—Pennsylvania crude oil on Aug. 13, reached the highest price in more than twenty years when the South Pennsylvania Oil Co. announced an advance of 15 cents, making the quotation for that grade $3.25. Other grades of crude oil were advanced to the following quotations: Mercer Black, $2.23; Corning, $2.50; Cabell, $2.47; Somerset, $2.30; and Ragland, $1.10.

Foreign Trade Inquiry.—An agency is desired by a man in France for the sale of bar iron for all purposes, steel wire and wire nails, tool steel, black and galvanized steel sheets, open-hearth and mild steel bars, mild steel plates, spikes, rivets, bolts, pig iron, and copper and brass wire. Interested parties should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D.C., regarding inquiry No. 25123.

Canada Favored in Coal Shipments.—Shipments of soft coal from Pennsylvania to Canada have caused a considerable increase in price. Although the stipulated price of $3.25 a net ton is supposed to prevail many industrial concerns have been compelled to pay as high as $4.15 a gross ton at the mines. Shipments to Canada are reported to be prompt while there is frequent delay in shipments to Philadelphia.

The Allen General Supplies, Ltd., Toronto, have sold to the United Gas & Fuel Co., Hamilton, a 16-in. Venturi gas meter, made by the Builders' Iron Foundry, Providence, R.I. This meter is a type, Q.S. register, indicator, recorder, capable of metering from 50,000 to 200,000 cub. ft. gas per 24 hours at 60 degrees Fahr., and .6 specific gravity. This meter gives the rate of flow, total flow, and a chart showing conditions for the day. This is the first Venturi gas meter installed in Canada.

British Steel Output.—The production of finished steel in Great Britain in 1916 is reported by the Iron and Steel Federation as follows:—Bloom, billets and rods, 1,945,000; sheet bars, 1,272,000; rails, 271,000; plates, 1,153,000; sheets, 78,000; shapes and angles, 757,000; beams and girders, 346,000; galvanized sheets, 132,000; tin plates, 577,000; total, 6,531,000 gross tons. The production of steel castings was 207,000 tons, of which 18,000 tons were made in electric furnaces. The production of wrought iron (puddled bars) was 960,000 tons.

Durham, Ont.—The National Portland Cement Co.'s plant here, one of the largest industries of its kind in Ontario, which has been idle for the past year, will commence operations next week. Workmen have been busy during the past few months repairing the buildings and installing new and up-to-date machinery.

Jones & Laughlin Plate Mill Starts.—The Jones & Laughlin Steel Co. have started up the 128-in. 3-high plate mill, which the company bought late last year from the Dominion Iron & Steel Co., Sydney, N.S. This mill will roll sheared plates up to 120 in. wide, and will have a capacity of 15,000 to 18,000 tons of plates per month.

Asbestos Development in Northern Ontario.—The Slade-Forbes Mining Co. is re-opening its asbestos property in Deloro township this week. The owners of this property expect to resume the shipments of the high grade asbestos at once, and another 100 ton shipment will go forward at an early date. The erection of a small mill will take place in the near future. A number of excellent samples of asbestos were brought in recently by prospectors from the northern part of Quebec Province where a number of veins of the mineral are in evidence, some of which are four feet in width—high grade asbestos.

No Embargo on U. S. Coal for Canada. Reports that the United States would embargo coal shipments to Canada were denied officially at Washington recently. Canada has been receiving large quantities of coal from the U.S. country recently because of the Dominion's reduced production, but coal experts now connected with the American Government say United States is producing enough coal for both countries, and that the problem is solely one of equitable distribution. New England users have complained that while coal is scarce in the north-eastern States great shipments are going through to Canadian consumers.

Steel in New Zealand.—A company has recently been formed in New Zealand, with a capital of $340,000, with the object of producing iron and steel from magnetic titaniferous iron sand, of which there is a large deposit on the coast at Taranaki, near New Plymouth, where the works are to be erected. The initial plant will be capable of dealing with 70 tons of iron sand weekly, but plans have been drawn up for the installation at a later rate of an additional furnace capable of dealing with 200 tons weekly. The production of steel is also

contemplated, and it is intended later to form a new company to carry out this development.

To Standardize Aircraft Metal Parts.—An international committee, formed to standardize aircraft metal parts, with a view of finding production on a large scale, held its first meeting in New York on Aug. 8, with representatives of England, France, Italy, Canada and the United States present. As an example of the kind of work the committee will have to do, it was pointed out that the average aeroplane has thousands of metal parts, one item alone being 248 turnbuckles. Heretofore these have been made in innumerable sizes and an effort will be made to reduce these to as few standard shapes and sizes as practicable to fit all aeroplanes.

Steel-making in Chili.—A steel industry has recently been inaugurated in Chili, a plant, on a small scale, having been put down at Santiago for the purpose of making steel from the old iron formerly exported to Europe, the high price of steel, since the war broke out, being the real cause of the new enterprise. At first great difficulty was experienced in finding workmen, but eventually Spaniards were imported from Bilbao, who instructed the Chilian apprentices under them. There are now over 100 workers employed, and Chilian coal, another form of economy, is used. The products of the mill include bars, plates, tees and angle iron, and there is an immediate market for all that can be produced.

Lake Superior Iron Ore.—Lake Superior iron ore shipments in July totaled 10,241,633 tons, exceeding the best previous month's record, in August, 1916, by 391,493 tons. On account of very late opening of navigation on account of the ice, the April and May shipments were less than those of a year earlier, but June and July have made up part of the deficit, and with 26,376,768 tons shipped to August 1st the deficit as compared with last year is only 2,988,956 tons. It is possible that half of this can be made up in the remainder of the season, which would make the year's shipment by water and all-rail about 65,000,000 tons. Recent studies of the situation made in ore and furnace circles indicate that a movement of 60,000,000 tons would probably carry the furnaces safely to the opening of navigation in 1918.

To Build Concrete Vessels.—A syndicate has been formed in Montreal and plans are about completed for the building of concrete steamships on the local water front. The Atlas Construction Co. of Montreal are the prime movers in this enterprise, and the members of the syndicate which will provide the initial working capital are well known business men of Montreal. Ships of this character have already been built in France and Italy, and are giving entire satisfaction. The first vessel of the kind to be constructed in Montreal will be 200 feet in length and the thickness of the hull will be from three to five inches. The cost of the vessel will be well within $100,000. The engines for this vessel

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We are manufacturers of stamped parts for other manufacturers.
We do any kind of sheet metal stamping that you require. Our improved presses and plating plant enable us to produce the finest quality of work in a surprisingly short time.
We can finish steel stamping in Nickel, Brass or Copper.
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"HAWK" D CHROME VANADIUM STEEL
Will Give You Exceptional
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WITHOUT AN EQUAL FOR BOTH FIRST AND SECOND OPERATION PUNCHES.
Comes to you heat-treated and ready for use.
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It means more shells per machine per day.
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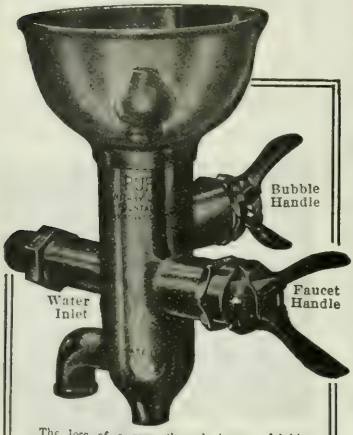
In Safety First and always.
In providing for the Health of my Fellow Workmen.
In Light and Air and sanitary Working Conditions.
In clean, fresh drinking water for everybody.
In the Safety, Economy and Man-betterment.

PURO SANITARY DRINKING FOUNTAIN

(MADE IN CANADA)



The loss of a man through impure drinking water is a crime that "the front office" must bear.

An ugly statement, isn't it? But true, absolutely.

When a man comes to work in your factory he puts his health in your keeping.

Are you willing to take chances on such a trust?

Impure drinking conditions are responsible for more tragedies than any machine ever built.

Apply the "Safety First" Principles to your water supply; don't deny your men a clean, fresh drink of water.

Conserve their health and they will improve your profits; make yourself as worthy of the name of "employer."

Install the Gold Medal winner Puro in your plant, office and shop alike.

The only Sanitary Drinking Fountain that is safe, sanitary, simple, automatic in control and easily attached.

Let us tell you just what it will cost you to

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LIMITED
Successors to
Owen Sound Iron Works
Owen Sound, Ont.
Engineers
Boiler-makers
Founders
Machinists

Tank Work
Smoke Stacks,
Grey Iron and Brass Castings,
Special Machinery
Made to Order

have been contracted for, and it is expected that the vessel will be launched before October 1. It is stated these vessels can be turned out more rapidly than steel vessels and at much less cost. The first vessel is more or less of an experiment, but if it is successful an aggressive shipbuilding programme by several Canadian firms will be the result.

Steel Imports Into Canada from U.S.—It is interesting to note the importations of various steel and iron products into Canada from the United States, and their relative values as compared with last year. The importation of steel billets and ingots was nearly twice as much this year as last, but the value of this year's importations was over three times as much as those last year. The importations of wire goods was nearly twenty million pounds less this year than last, but owing to the higher price obtainable, the value of the importations was actually more this year than last, as can be seen in the following comparisons:

	1917.	1916.
Tin plates, tern plates and taggers, tin, lbs..	135,622,492	117,364,108
Value	$7,718,619	$3,979,069
Wire and wire goods, lbs.	109,212,971	129,894,358
Value	$3,925,421	$3,674,850
Steel billets, ingots, etc. tons	183,161	92,257
Value	$13,499,356	$3,733,393
Steel rails for railways, tons	72,547	11,106
Value	$2,725,475	$369,650
Sheets and plates, lb....	561,088,568	518,710,230
Value	$ 21,026,003	$ 11,423,948

Commission to Control U. S. Coal Situation.—Armed with authority to fix coal prices from the mouth of mines to the consumer, the Federal Trade Commission is preparing to take charge of the fuel situation, hoping to solve much of the industrial troubles of the country. Under the Pomerene amendment to the Food Bill, the President may fix prices and rules of practice of all coal men, miner and middleman, and if he sees fit, take over the business. The amendment establishes absolute government control of what experts believe is the biggest factor in war preparation. Federal trade officials—expecting the President immediately to turn over to them the task of coal control, are speeding their investigation to fix costs from the mine to the consumer. A report of the commission to be published shortly is expected to put the blame for a coal "shortage," declared to be artificial, jointly on coal producers and railroads. Huge exports of coal are being made to Canada, it is charged, in order to create a shortage that will result in higher prices here.

PERSONAL

N. F. La Sauvage, traffic manager at the Montreal office of the Steel Company of Canada has been in Toronto for several days on a business visit.

Alexander Gillespie, for twelve years past resident engineer at the Waterworks Department at Brantford, Ont., has tendered his resignation, to take effect on September 1.

Fraser S. Keith, secretary of the Canadian Society of Civil Engineers, has left on a tour of the western branches of the society. He will go as far west as Prince Rupert and Victoria, B.C.

Charles G. Knott, manager screw department Toronto office, Steel Company of Canada, is spending his vacation on a motoring trip in the Eastern States.

Messrs. George Wedlake, of the Cockshutt Plow Co., and **F. W. Nichols,** both of Brantford, Ont., have been appointed by the joint committee on Technical Organization, district representatives in the industrial research census to be taken of all the industries of the Dominion.

Captain Kay has been appointed the master of the steamer War Dog, the first steel ocean-going vessel to be built in Vancouver, B.C. Captain Kay has been in the employ of Chambers & Co. of Liverpool for many years and since war broke out has been doing transport work. The War Dog will shortly leave Vancouver on her first voyage.

Henry Croft, a resident of Victoria, B.C., for the past thirty-two years, and recognized as one of the most widely versed authorities on mining in British Columbia, died suddenly on July 28, at his residence, "Mount Adelaide," Esquimalt, B.C. Mr. Croft was 61 years of age, having been born on January 15, 1856, at Mount Adelaide, Sydney, Australia.

W. P. Hinton, traffic manager of the Grand Trunk Pacific, has been appointed vice-president and general manager of the G.T.P. and G.T.P. Coast Steamship Co., with headquarters at Winnipeg. Mr. Hinton who was born at Ottawa in 1871 has been engaged in railway work for the past thirty years and was at one time connected with the old Canada Atlantic, which was absorbed by the Grand Trunk in 1905. Mr. Hinton succeeds **Morley Donaldson** who has resigned on account of ill health.

Morley Donaldson who is retiring from the Grand Trunk Railway was born in Edinburgh, Scotland, on May 1, 1851. He was for some time in the engine works of E. Gilbert & Co., Montreal, and in 1881 entered the service of the Canada Atlantic Railway as chief draughtsman. He became successively mechanical superintendent, superintendent of traffic and mechanical departments; general superintendent, until the road was merged with the G.T.R. System, 1905. He has been vice-president and general manager, G.T.P. since 1912.

MARINE

Victoria, B.C.—The fourth auxiliary schooner Malahat now being built for the Canada West Coast Navigation Co., will soon be ready for launching.

Victoria, B.C.—The auxiliary schooner Margaret Haney, Capt. Boyd, reached Bombay after an 86-day voyage which covered 1,200 miles.

Victoria, B.C.—The auxiliary schooner Esquimalt, the third of the vessels built at yards of the Cameron-Genoa Shipbuilders will leave shortly for chemainus to load lumber for Australia.

Port Dover, Ont.—A movement has been inaugurated to develop the harbor here in order to secure a shorter route for the haulage of coal to points in Central Ontario.

Victoria, B.C.—The Janet Carruthers,

which was launched at North Vancouver on June 28, has gone up to Ioco to take on bunker fuel and to commence loading lumber for Port Adelaide, Australia.

New Westminster, B.C.—The New Westminster Construction & Engineering Co. have laid the keels of two vessels being built here for the Imperial Munitions Board. The concern is building four vessels for the Government at its Poplar Island plant.

Fort William, Ont.—James Whalen, president of the Port Arthur Shipbuilding Co., stated in an interview recently that his company has just secured additional contracts involving the expenditure of $2,000,000, which will keep the docks working to full capacity until far into 1919, summer and winter.

New Lighthouse Installations. — The Lake Carriers' Association of Detroit, Mich., has received notice from the Department of Marine and Fisheries of Canada, that a flashing white catoptric light at the west end of Long Point, on the neck, between the lake and inner bay, is still in operation and that its maintenance has not been discontinued. The Kincardine back range lighthouse, Lake Huron, has been painted white. Announcement is made by the United States Bureau of Lighthouses that light near the outer end of the west pier at Charlotte, Lake Ontario, is being changed from a fixed red to an occulting white light, of 4,000 candle-power, showing illumination of six seconds alternating with eclipse of four seconds.

INCORPORATIONS

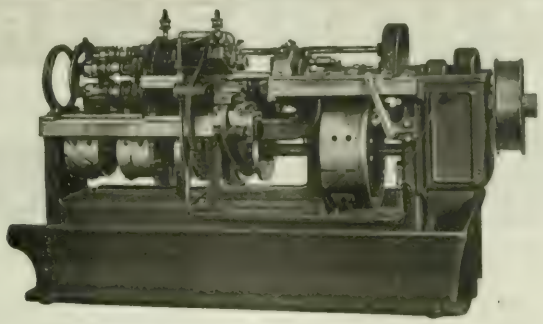
Montreal Machine Shop, Ltd., has been incorporated at Ottawa, by G. Mayrand, H. Hardy and L. Guilbault of Montreal, to operate machine shop and manufacture engines and motors of all kinds at Montreal, with a capital of $100,000.

Dominion Molybdenite Co. has been incorporated at Ottawa by S. G. Metcalf, Charles Murphy and A. C. Craig of Montreal, to carry on a mining, milling and smelting business, with head office at Ottawa, and a capital of $5,000,000.

The Toronto Shipbuilding Co., has been incorporated at Toronto with a capital of $100,000 to build steam ships and vessels of all kinds at Toronto. The provisional directors are J. E. Russell, J. J. Manley and S. W. McKeown, all of Toronto.

Toronto Dry Dock Co. has been incorporated at Toronto with a capital of $100,000 to operate a dry dock and to build and repair ships of all kinds at Toronto. The provisional directors are John E. Russell, H. Cresswell and S. W. McKeown all of Toronto.

S. & F. Motors Corporation, Ltd., has been incorporated at Ottawa with a capital of $46,000, to manufacture motor cars, motorcycles and motorboats at Montreal. The incorporators are Mitchel Freund, M. Mackay of Montreal, and A. N. Dufresne of St. Cesaire, Que.



Screw Machine Queries:

"WHAT ABOUT POWER CONSUMPTION?"

POWER CONSUMPTION, while not a decisive factor in the choice of a multiple-spindle automatic, is a matter of more dollars and cents importance than is commonly attached to it by prospective purchasers.

Cutting Tools are, of course, responsible for the bulk of the power consumed. Generally speaking, there is little chance for economy here, assuming proper care and lubrication.

Spindle Bearing Design, however, has a very material influence on the amount of power required to drive the machine.

The New Britain's chrome-nickel steel spindles are hardened and ground and run in straight bronze bearings. The use of the straight bearing is made possible by the employment of ball thrust bearings on the spindles.

The resultant advantages over the taper type of bearing formerly used are—a larger bearing surface, freedom from spindles sticking, and a 30% reduction in power required to drive them.

The complete elimination of spiral gearing and chains in the NEW BRITAIN'S design in the use of spur gearing throughout, constitute an added power-saving factor.

The "NEW BRITAIN" S-I-X possesses other features productive of still greater economies. Send for descriptive bulletin.

The New Britain Machine Company

—Automatic Screw and Chucking Machines—

New Britain, Conn., U.S.A.

You Want A Good Man

for that position you have open, don't you? Then why not advertise for him in the paper he reads? Only the mechanics who are architects and who are capable of filling the responsible positions supply to CANADIAN MACHINERY. Your "Help Wanted" ad. in CANADIAN MACHINERY will bring responses from this class.

Prove it to your satisfaction and benefit

Canadian Machinery

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FOR SALE

A PAYING PROPOSITION FOR RAILROADS or manufacturers. Wish to sell our Canadian rights with fixtures. Address Frank Bayless, 311 Fair Street, Springfield, Ohio. c9m

FOR SALE — 1 LEES-BRADNER THREAD miller, equipped for threading nose and base of 6" shells. Apply The Hayes Wheel Co., Chatham, Ontario. c9m

ONE ARMINGTON & SIMS 10" x 12" HIGH speed engine, belted to one Westinghouse Electric Mfg. Co. direct current generator, 40 K.W., 550 volts, 75 amps.; speed 910 r.p.m.; also 40' 0"-10" double leather belting; all in good condition. Armstrong, Whitworth of Canada, Limited, Montreal, Que. c6m

FOR SALE—THE TORONTO ELECTRIC COMmissioners have for sale a quantity of second-hand 60-cycle meters and transformers recently in service, also quantity of electrical supplies. List of material and full particulars may be obtained on application to the Purchasing Agent, 15 Wilton Avenue. The quantities are not guaranteed, and all are subject to prior sale. No tender necessarily accepted. Toronto Hydro-Electric System, 226 Yonge St., Toronto. c7m

HYDRAULIC EQUIPMENT FOR SALE.—The equipment listed below is in first-class shape having only been used about three months. Blue prints and specifications and foundations drawings will be furnished. 2—14 x 12 x 5" Fairbanks-Morse duplex steam driven high pressure pumps at 80 gals. per minute capacity each against 600 lbs. pressure, steam pressure 150 lbs. 1—Weighted Accumulator good for 1000 lbs. per sq. inch, 16" diameter, plunger 11 ft. stroke with squeezing water cushion and wooden outside bumper blocks. The tank for the weighing material surrounding the cylinder is 10' 7" in diameter and 11' 0" high. 1—Return Suction Tank for above pumps and accumulator. Height, 9' 0", diameter 8' 0". Capacity, 2700 Imperial gallons. This equipment can be shipped immediately and is open for inspection at the company's plant. Prices on application. The Canadian Copper Company, Copper Cliff, Ont. c8m

SPECIAL MACHINERY

H. C. THOMAS, GENERAL MACHINE SHOP, tools, jigs and machine repairs. 301 King St. W., Toronto. Telephone Adelaide 3836. tf

MANUFACTURERS—WE CAN UNDERTAKE work to any specification—munition production equipment or otherwise. Write W. H. Sumbling Machinery Co., 7 St. Mary St., Toronto.

PATENTS

THE PROPRIETOR OF LETTERS PATENT M. R. Matti No. 137,772, "Arrangement for changing the moment of fuel injection into the combustion chamber during the run of the motor and for regulating the quantity of fuel," desires to dispose of the patent or to grant license to interested parties at reasonable terms, with a view to the adequate working of the patent in Canada. Inquiries to be addressed to the patentees, Stora Kopparbergs Bergslags Aktiebolag, Falun, Sweden. c7m

WANTED

WANTED—AIR COMPRESSOR — MUST BE in good condition; give full particulars as to make, size and price. Box 324, Canadian Machinery. c27m

WANTED—SECOND-HAND POWER SQUARing shear to cut No. 10 gauge steel up to 24" wide. Must be in good working condition. Packard Electric Company, St. Catharines, Ont. c4m

1 POWER HAMMER, 500 LBS. CAPACITY. Belt driven. 2 24 or 26 x 10 or 12 ft. C.M.C. engine lathes. 1 Pipe Threading Machine with tangent die attachment to cut between ⅜ to 3 inch. 1 Vertical Boring Machine, 42" table, Buller or Niles type. These machines must be in first-class condition and reasonable in price. Apply: P.O. Box 1965, Montreal, P.Q. c4m

SITUATIONS WANTED

PRACTICAL WORKS MANAGER AND MEchanical expert with years of experience in United States and Canada, a specialist in munition work, open for engagement. Best of references. Apply Box 304, Canadian Machinery. c4m

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ARE YOU LOOKING FOR PRODUCTION IN your tool room? High-grade tool room foreman desires position in a fuse or shell factory where results count. Will be at liberty Aug. 1st. Do not reply if you do not want a man to take full charge. Box 323, Canadian Machinery.

FOR

IMMEDIATE DELIVERY

No. 28—17" x 96" Brown & Sharpe Plain Grinder.

Pratt & Whitney Vertical Surface Grinder, 36" Table.

No. 1½ Bath Universal Grinder, complete tool room equipment.

No. 1½ Landis Universal Grinder, for Internal and External Grinding.

36 ft. Niles Plate Planer.

Lynd-Farquhar Co.

Boston, Massachusetts

SITUATIONS WANTED

A PRACTICAL MACHINE SHOP SUPERINtendent of broad experience in Canada and States will be open for position as superintendent or general foreman, July 15th. A1 references. Address Producer, Box 321, Canadian Machinery. c3m

SITUATIONS VACANT

THOROUGHLY CAPABLE BRASS FOUNDRY Foreman to take charge of small foundry doing a general jobbing business and also munition work. Location Montreal. Address for information, "Brass Foreman," P.O. Box 1934, Montreal. c26m

MECHANICAL DRAFTSMAN WANTED. Experienced on engines or turbines, capable of working out engine details. Apply giving full particulars as to experience, salary required, and enclose references, to Henry Hope & Sons of Canada Limited, Peterborough, Ont. c6m

NIGHT SUPERINTENDENT FOR SHELL MAchinery plant in Western Canada; knowledge of four point five shell and good all-round experience essential. Write, stating qualifications, salary and references, otherwise application will not be considered. Box 325, Canadian Machinery. c6m

FOREMAN WANTED—FOR SHOP IN CENtre of Toronto, with up-to-date equipment, employing about thirty men, doing jobbing business and making fine special machinery and tools. When applying state experience and give references, also wages expected. Only first-class men need apply. Box 326, Canadian Machinery. c8m

WANTED — ASSISTANT SUPERINTENDENT for six-inch shell factory. Must be capable of getting maximum production from an established plant and have good mechanical experience. Duties to consist chiefly in supervising production. Give full particulars in writing of previous experience, age, references, and salary required, to Henry Hope & Sons of Canada, Ltd., Peterboro. All information will be treated in the strictest confidence. c5m

2 New No. 2 Cincinnati Full Universal Millers

1 No. 3 LeBlond Universal Miller, Double Back Geared, Motor Drive

1 No. 2 Kempsmith Universal Miller

1 Smith & Mills 16" Back Geared Shaper

1 Smith & Mills 16" Crank Shaper

1 No. 30 Bliss Arch Press

1 Pratt & Whitney 2¼ x 26 Turret Lathe, Pan Bed, Friction Back Geared Head

J. GELB & CO.

203 Centre St., New York City

ASSISTANT SUPERINTENDENT WANTED

Assistant Superintendent wanted for 4.5" shell factory. Must be capable of getting maximum production from established plant, and have good mechanical experience. Duties to consist generally in supervising production. Give full particulars in writing of previous experience, age, references, and salary required. All information will be treated in the strictest confidence.

The McFarlane Engineering Co.
PARIS, ONTARIO c7m

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4—11 x 6 Flather Engine Lathes, C.R., Q.C.G., new.
4—11 x 5 Reed Engine Lathes, R. & F.
3—18 x 8 Davis Engine Lathes, D.B.G.
1—18 x 10 Rahn-Larmon Engine Lathe, new.
1—18 x 12 Rahn-Larmon Engine Lathe, new.
1—22" x 10' Nicholson & Waterman Engine Lathe.
1—No. 13 B. & S. Automatic Gear Cutter.
1—30" Newark Automatic Gear Cutter.
1—5 x 18 Pratt & Whitney Plain Grinder.
1—No. 2 Bath Universal Grinder.
1—12 x 60 Modern Plain Grinder, new.
2—Lees-Bradner Thread Millers.
1—30 x 30 x 8' Powell Planer, new.

Brownell Machinery Co.
Providence, R. I.

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50—No. 18 Bliss Type Inclinable Presses.
6—No. 19 Bliss Type Inclinable Presses, with roll feeds.
1—Double Acting (Michigan) Press.
1—Double Acting (Rhodes England) Press.
1—Brown-Boggs Multiple Power Shears.

A large number of these presses are equipped with Dial Feeds. Have only been used for a few months—good as new. Will be sold at a bargain if purchased at once.

Apply 702 Excelsior Life Building
TORONTO

H. W. PETRIE of MONTREAL Limited Montreal, Que.

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New 15" x 5' Lancaster Sgl. B.G., Geared Feed.
New 20" x 6' South Bend, Sgl. B.G., Stan. Change Gears.
S.H. 15" x 6' South Bend, Sgl. B.G., Stan. Change Gears.
New 16" x 6' South Bend, Sgl. B.G., Stan. Change Gears.
New 12" x 2' Oliver Dbl. B.G., Q.C. Gear, Oil Pump and Pan.
New 18" x 24" x 10' South Bend Gap Sgl. B.G., Stan. Change Gears.
S.H. 22" x 8' Greaves Klusman Sgl. B.G., Geared Feed.
New 28" x 8' Greaves Klusman Dbl. B.G., Geared Feed.
New 18" x 8' Giddings & Lewis Dbl. B.G., Geared Feed.
New 18" x 8' Sterens Sgl. B.G., Standard Change Gears.
New 16" x 8' South Bend Sgl. B.G., Stand. Change Gears.
S.H. 18" x 10' Muller Sgl. B.G., Standard Change Gears.
New 18" x 12' South Bend Sgl. B.G., Stand. Change Gears.
S.H. 20" x 10' Flather Sgl. B.G., Standard Change Gears.
S.H. 20" x 10' Fay & Scott Sgl. B.G., Stand. Change Gears.

HEAVY DUTY MANUFACTURING LATHES

New 29" x 8' Petrie Heavy Duty Manufacturing Lathes.

TURRET, SPEED AND BRASS LATHES SCREW MACHINES

New 13" x 7' Potman Speed Lathe.
S.H. 15" x 5' 6" Fox Brass Lathe with Chasing Vee Attach.
S.H. 30" x 36' Vilter Lathe, Friction B.G. Geared Feed with 18" Hex. Power Feed Turret.
New No. 0 Foster Plain Head Screw Machine, with wire feed and automatic chuck.

DRILLS

New 3' Jerome Plain Radial Gear Box Drive.
New 40" Excelsior, Back Geared Wheel Lever Power Feed.
New 30" Silver, Back Geared Wheel Lever Power Feed.
New 14" Leland Gifford Single Spindle Sensitive.
S.H. 14" Avey Single Spindle Sensitive.
S.H. 14" Foote-Burt Four.
New No. 1 Imco Bench Single.

HACK SAW MACHINES

New Peerless High Speed.
New No. 1 Arkell Rapid Kut.

GRINDING AND BUFFING MACHINES

New 36" Hand Smith, Water Tool Grinder.
New 36" Hand Smith, S.O. General Purpose Pedestal Grinder.
New 36" Hand Smith S.O. General Purpose Pedestal Grinder.
New 36" Hand Smith, S.O. General Purpose Pedestal Grinder.
New 36" Hand Smith, S.O. Combination Grinder and Buffer.
New 36" Hand Smith S.O. Buffing Machine.
New 8" Hand Smith Plain Universal Tool Grinder.

MISCELLANEOUS

S.H. No. 2 Gardner Vertical Milling Machine.
S.H. No. 2 Wilmarth Hand Milling Machine.
New 24" Newton Jig Borer and Hand Screw Machine.
New Cincinnati No. 14 Shaper.
New No. 4 Pratt & Whitney Tool Room Lathe.
New No. 12 Oliver Cutting Off Saw.
New No. 4 Pratt & Whitney Hand Punching Press.

Telegraph, Phone or Write for Prices and Further Particulars

H. W. PETRIE of MONTREAL
LIMITED
MONTREAL, QUEBEC

PETRIE'S LIST

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TURRET LATHES AND SCREW MACHINES

12" x 12" Foster plain head.
[illegible] x [illegible] Automatic Jax.
[illegible] x 6 Pratt & Whitney turret.
15" x 6 Prentice high speed.
27" x 8 Pratt & Whitney.
24" x 8 Lodge & Shipley.
26" x 8 Fay & Scott, B.G.
No. [illegible] Hexagon screw machine.
No. 2 Warner & Swasey, plain head.
No. 6 Warner & Swasey, friction head.

ENGINE LATHES

15" x 6 Lancaster, D.B.G.
14" x 6 Lodge & Shipley.
16" x 6 Lancaster, back geared.
16" x 8' McDougall, back geared.
[illegible] x 8 Lancaster, back-geared.
18" x 6 New Haven.
18" x 10 Putnam, back-geared.
20" x 8 Lidgerwood, back geared.
24" x 9' lathe-geared, stagger purpose.
24" x 8' Breeden, heavy duty.
24" x 11 Pond, back-geared.
30" x 10' Ames, back geared.
30" x 16' Pollard, back-geared.
18" x 32" x 12' C.M.G. gap.
24" x 40" x 20' Dundas, gap.
28" x 50" x 24' Bertram, gap.

DRILLS

13" Perfect, 2-spindle.
14" Excelsior, sensitive.
16" Barr, sliding head.
18" Buffalo, post drill.
20" Perfect, lever feed.
20" Silver, back-geared.
22" Barnes, back-geared.
24" Kerkhoff, sliding head.
40" Bickford, back geared.
64" Canedy-Otto, wall radial.
No. 10a Baush, 16-spindle.
No. ½ Avey, ball bearing, bench.

GRINDERS

No. 1 Wilmarth & Morman
No. 1 Cincinnati, universal tool
No. 2 Landis.
No. 2 Sellers, universal.
No. 3 Modern, universal.
No. 14 Besly, with shell holder.
26" Gardner, disk.

IRON PLANERS

20" x 20" x 5' Bertram.
24" x 24" x 6½' Bertram
24" x 24" x [illegible] Cincinnati, 2 heads
22" x 22" x 12' Lodge & Davis
36" x 36" x 10' Sellers, 4 heads
40" x 40" x 12' New Haven, power feed

MILLING MACHINES

No. 0 Rivett, hand feed
Bertram, plain.
Brown & Sharpe, power feed, plain.
Fitchburg, geared, plain.
No. 2 Lucas-Smith.
No. 6 Whitney, hand feed.

SHAPERS.

16" Canada Mach. Corp.
16" Hendey.
16" Queen City, back geared.
20" Cincinnati, back geared.
24" Gould & Eberhardt.
30" Morton, draw cut.

MISCELLANEOUS

[illegible] and 12" Rivett Hack Saws.
4" and 6" Robertson Hack Saws.
6" Kennedy Cutting-off Machine.
[illegible] Hand Pipe Machine.
[illegible] Bertram Screwing Machine.
No. [illegible] Canada Punch Co. Punching Machine.
Nos. 1 and 2 Cincinnati Arbor Presses.
No. [illegible] Niles Foot-power Press.
Bertram Single Punching Press.
[illegible] Compound Punch and Shear.
No. [illegible] Bertram Universal Punch and Shear.
[illegible] and Punching Press.
[illegible] Bertram Drop Hammer.
[illegible] Williams Drop Hammer.

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We Own Every Tool Offered

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1—28 x 10 Hamilton Standard Engine Lathe, with turret.
1—28 x 16 Putnam Standard Engine Lathe.
1—22 x 14 Putnam Standard Engine Lathe.
3—New 18 x 8 Springfield Engine Lathes.
1—New 16 x 8 Springfield Engine Lathe.
1—New 14 x 6 Springfield Engine Lathe.
1—18 x 6 Jones & Lamson Standard Engine Lathe.
1—16 x 8 Porter Standard Engine Lathe.
2—16 x 8 Reed Stud Lathes.
1—14 x 8 Sebastian Standard Engine Lathe.
1—14 x 6 Lodge & Shipley Engine Lathe.
1—14 x 6 Springfield Engine Lathe.
1—14 x 6 Prentiss Engine Lathe.
1—14 x 6 Sebastian Engine Lathe.
2—14 x 6 Van Werk Engine Lathes.
1—11 x 5 Seneca Falls Engine Lathe.
1—No. 3 Hartiarge Bench Lathe.

TURRET AND SCREW MACHINES

1—2¼ x 24 Jones & Lamson Flat Turret Lathe, S.G.H.
1—2 x 24 Jones & Lamson Flat Turret Lathe, cone head.
2—No. 6-A Potter & Johnson Automatic Lathes.
3—No. 4 Foster F.G.H. Head Screw Machines.
2—No. 3 Foster F.G.H. Hand Screw Machines.
1—No. 5 Pierson F.G.H. Hand Screw Machines.
1—No. 4 Smurr & Kamon Hand Screw Machine.
4—New 14" Pierce Turret Lathes.
2—New 1 x 8 Pierce Hand Screw Machines.
2—2" Cleveland Automatic Screw Machines, jogger feed.

MILLING MACHINES AND GRINDERS

2—No. 3 Cincinnati Universal, cone type.
5—No. 1½ Knight Milling & Drilling Machines.
2—No. 13 Pratt & Whitney Lincoln Type Milling Machines.
1—No. 1 Cincinnati Plain Milling Machine.
1—No. 13 ½ Garvin Plain Milling Machine.
1—No. 2 Hendey Plain Milling Machine.
3—Fox Hand Milling Machines.
1—Garvin Hand Miller.
1—No. 2½ Bath Universal Grinder.
1—No. 170 Wells Cutter Grinder.
1—Mina Valley Universal Cutter Grinder.
4—No. 0 Burke Bench Millers (new).

DRILL PRESSES

1—3-spindle 8" overhang Henry & Wright High Speed Drill.
3—12" Leland & Gifford High Speed Bench Drills.
5—20" Buffalo Plain Drill Presses.
4—6 spindle Fox High Speed Drill Presses.
2—4-spindle Fox High Speed Drill Presses.
1—3' Mueller Plain Radial Drill.
1—4' Bickford Radial Drill, with T.A.
1—6' Mueller Plain Radial Drill.
1—16-spindle Natco.

SHAPERS AND PLANERS

1—24" Ohio H.D., B.G. Crank Shaper.
1—24" New Barker Crank Shaper.
1—24" Lodge & Davis Geared Shaper.
1—18" Hendey Geared Shaper.
1—16" Hendey Geared Shaper.
1—16" Garvin Shaper.
2—16" New Springfield B.G. Crank Shapers.

PRESSES

1—Waterbury-Farrell Straight Sided Geared Press with double cam knock-out.
1—No. 10 Perkins Drawing Press.
5—No. 2-W Bliss Wiring Presses.
1—800-lb. B. & S. Roll Board Hammer.
1—800 lb. P. & W. Roll Board Hammer.
1—50 lb. Scranton Belt Hammer.
1—25-lb. Bradley Helve Hammer.

AIR COMPRESSORS

1—8 x 6 Westinghouse Steam Air Compressor.
1—16 x 18 x 12 Union Steam Pump Co., steam driven air compressor.
1—10 x 10 Ingersoll Sargent Belt Driven Air Compressor.
1—10 x 10—Clayton Belt Driven Air Compressor.
1—8 x 8 Fairbanks-Morse Electircal Driven Air Compressor.
1—8 x 8 Gardner Single Belt Driven Air Compressor.
1—8 x 8 Union Steam Pump Co. Belt Driven Air Compressor.
1—7½ x 6 Chicago Pneumatic Tool Co. Belt Driven Air Compressor.
1—6 x 6 Chicago Pneumatic Tool Co. Belt Driven Air Compressor.

We also carry a large stock of Steam Engines, Steam Pumps and Electrical Equipment of all kinds.

We are in the market to purchase machines tools both large and small.

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ELECTRIC TRAVELING CRANES.

50-Ton, 61' 7" span, four motor, 550 volts, D.C.
25-Ton trolley, three motor, 220 volts, D.C.
10-Ton, 40' span, 80' lift, three motor.
5-Ton, 47' 6" span, three motor, 110 V., D.C.
3, 14 and 4½ H.P. Shaw crane motors, 220 volts, D.C.
10 H.P. Akron crane motor, 220 volts, D.C.
10-Ton hand crane, 55' 0" span.
20-Ton hand crane, 29' 6" span.
2-Ton hand cranes, 22' span.

PUNCHES AND SHEARS.

Lever Shear (double), cap. 2" sq.
28" throat (single), cap. ⅞x⅞" (belt).
36" throat (single), cap. 1¾x1" (belt).
48" throat (single), cap. 3x1¼" (steam).
16" throat (single), cap. 1½x1⅛ (belt).
38" throat (single), cap. 1x1" (belt).
36" throat (single), cap. ⅞x⅞" (belt).
17" throat (single), cap. ¾x¾" (belt).
15" throat (single), cap. ¾x½" (hand).
10" throat (double), cap. 1½x1" (belt).
Angle Shear (double), cap. 6x6x⅝" (belt).
Angle Shear (double), cap. 6x6x¾" (belt).
Plate Shear (Univ.), 18" blade, cap. ½".
Rotary splitting, 30" throat, cap. ½".
Rotary bevel, 5" throat, cap. ½".
Coulter & McKenzie, cap. 3x½", spring steel.
Guillotine, Perkins, No. 6, cap. 2½" sq.

MISCELLANEOUS.

Acme Rivet and Upsetter, 1½" cap.
Bending Roll, 6', drop end, 6½ and 8" rolls.
Bending and Straightening Mch., 24" cap., 1" stroke.
Grinder, No. 10 B. & S. Plain.
Grinder, No. 13, B. & S. Universal and Tool.
Rotary Planer, 36", Cleveland No. 2.
First-class condition—quick shipments.
Saw, cold, 26" blade, 48" travel.
Press (trimming) No. 11 Perkins, 16,500 lbs.

McCoy-Brandt Machinery Co.

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Federal Machinery Sales Company

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Rebuilt Tools—Immediate Shipment

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24" Hoefer, upright, sliding head, b.g., p.f.
25" Hamilton, sliding head, b.g., p.f.
2-spindle 20" Barnes, gang, b.g., p.f.
Silver, 20", wheel and lever feed (15), new.
Silver, 20", b.g., p.f., automatic stop (20), new.

GEAR CUTTERS.

Gould & Eberhardt, 22" x 5" x 6 pitch, auto. spur and bevel.
Whiton 24" Automatic Spur Gear Cutter.

GRINDERS.

No. 2 Oakley Universal Cutter and Tool Grinder, new.
No. 2 American Surface Grinders (2), new.
Landis 8" x 20" Universal.
Landis 16" x 66" Crank Grinder with extra plain heads if desired.

LATHES.

16 and 17" x 8' Engine Lathe (6), Porter, Cincinnati, etc.
16" x 8' South Bend (2), new.
18" x 12' American, c.r., h.s.
17" x 6' National, quick-change gear, c.r., h.s.

MILLING MACHINES.

Pratt & Whitney Lincoln type (2).
No. 1½ American Universal.
No. 3 Aurora, plain, back-geared.
No. 1½ Grand Rapids, back-geared, plain.
No. 13 Brown & Sharpe Mfg., plain.
4-spindle Warner & Swasey Valve Miller, good as new.

PRESSES.

No. 5 Cleveland, open back, inclinable, plain, new.
C1 Ferracute, open back, inclinable, plain, new.

SCREW MACHINES AND TURRET

2¼" Acme, fric. grd. head, p.f. to turret.
Bardons & Oliver No. 1, 13-16" cap.
Hamilton, 20" swing x 8' bed, fric. head, eng. tur. lathe, pan bed, power feed turret on bed.
Pond 21" Heavy Duty Rigid Turret Lathe, geared head.
Jones & Lamson 3" x 36" Grd. Sliding Head Turret Lathe, bar equipment.

SHAPERS.

20" Hendey Friction Shaper.
20" Cincinnati Back-geared Shaper.

MISCELLANEOUS.

High Speed Hammer Co.'s No. 4A Riveting Hammer.
3" Smith & Post Cold Saw.
D14 Rock River Geared Power Splitting Shear.
60" Bertsch Foot Power Gap Squaring Shear.

Send for complete list. c8m

Chas. A. Strelinger Co.,

43-51 E. Larned St.,
DETROIT - MICH.

Machine Tools For Immediate Delivery

DRILLING MACHINES.

No. 3 Barnes Horizontal Radial Drill.
Henry & Wright Sensitive Drilling Machines.
No. 1-S Garvin B. G. Horizontal Drill with Pump and Piping.

GRINDERS.

Wells No. 160 Cutter and Reamer Grinder.
Capitol Internal Grinder with water attachment.
No. 2 Diamond Auto. Surface Grinder, belt driven.
No. 3 Wilmarth & Morman Surface Grinder.
No. 3 La Salle Grinder, complete.
Geometric Chaser Grinder, with countershaft.
No. 4 and No. 6 Gardner Pl. Bearing Disc Grinder.
No. 2 Diamond Wet Tool Grinder with wheel truing device.

LATHES.

No. 10-K Seneca Falls 9" x 4' Bench Lathe.
14" x 6' Monarch Q.C., S.B.G. Engine Lathe.
17" x 8' Sidney Q.C., D.B.G. Engine Lathe.
19" x 8' Sidney Q.C., D.B.G., Engine Lathe.
16" x 7' Oliver Q.C., D.B.G. Lathe, with pan and pump.

SCREW MACHINES.

No. 1 New Howe Pl. Hd. Screw Machine, with auto. chuck.
1½" Dreses Screw Machine, F.B.G., Power Feed.

MILLING MACHINES.

Wisconsin Hand Miller on column, complete.
No. 6 Whitney Hand Miller, complete with countershaft.
No. 1 U.S. Hand Miller, complete with cshaft.
H. B. Smith Hand Miller, complete with cshaft.
No. 1 Standard Hand Miller, with oil pump equipment.

PRESSES.

Atlas Presses, No. 0 to No. 5 inclusive.
Greenerd Arbor Presses, No. 1 to No. 6 inclusive.
No. 5 Toledo Geared O.B.I. Power Press.
Manhattan Ratchet Type Screw Press.

THREADING MACHINES.

Geometric ¾" Threading Machine.
No. 38 Curtis & Curtis Hand Power Pipe Machine.
No. 5½ Merrill Comb. Hand and Power Pipe Machine.

C. W. CULLEN MACHINERY CO.

LEADER-NEWS BUILDING

CLEVELAND, OHIO

Bickford 4½' Plain Radial Drill, cone drive.
No. 3 Lapointe Broaching Machine, new.
2—P. & W. No. 2 Cutting-off Machines.
Bement Miles & Co. 7½" Vertical Spindle Crank Drilling and Boring Mill, 68" swing.
Detroit Japanning Ovens, 8' 10" x 8' x 152".
Pratt & Whitney 48" Gap Lathe.
Hanna 30-ton Riveter, 12" reach.
Pangborn Sand Blast, 90" rotary table, M.D.
3—800-ton Gen. El. Hydraulic Double Action Presses.
3 2¼ Cleveland Automatics; prac. new.
10—¾" B. & S. Automatics.
Allis Chalmers 150 H.P. Corliss Engine, 12' F.W.
Bruce MacBeth 150 H.P. Gas Engine; new.
2—Rathmann Jones Gas Engines, 125 and 225 H.P.
80" Niles Vert. Boring and Turning Mill, 2 heads, slotting attachment.
Ingersoll-Rand Air Comp., 342 cu. ft., steam driven, inter-cooler, complete.
Bertsch Straightening Rolls, 7" x 84"-3" vert. adj. M.D.
Kelly Springfield 10-ton Road Roller, rebuilt.
Vulcan 1 cu. yd. Steam Shovel, traction; weight 35 tons; new flues.
62-ton Baldwin Consolidation Locomotive.
Ajax No. 1 Taper Forging Rolls, 50 strokes.
One No. 5 S-3 Cold Langelier Swadger.
3—No. 7 H.S.-6 Langelier Swadger.
1 Bolt and Rivet Header, hand feed, ⅝" x 3½" rivets.
Bolt and Rivet Header, hand feed, ¾" x 4" rivets.
70-C Bucyrus Steam Shovel, St. G.
R. Is. Locomotive, 45 tons, St. G.

IMMEDIATE DELIVERY

DRILLING MACHINES

Leland H.S., B.B., bench type.
No. 1½ Knight Driller and Miller.
14" Rockford Sensitive.
20" Kern, b.g.
22" W. F. & J. Barnes, s.h., b.g., p.f.
No. 25 Foote-Burt 24" drill (new)
32" W. F. & J. Barnes, s.h., b.g., p.f.
32" Hamilton, s.h., b.g., p.f.
No. 30-C Baush, 12 spindle.
20" W. F. & J. Barnes, 4 spindle.
3' W. E. Gang Plain Radial
3½' W. E. Gang Plain Radial
Pawling & Harnischfeger Horizontal Driller.
No. 1B Bement Horizontal Driller and Borer.
48" Colburn Mill, 2 swivel heads.

GEAR CUTTERS

Reynolds Hobber.
No. 11 B. & S. automatic.
30" x 9" G. & E. auto. for spur and bevel.
24" x 7" G. & E. for spur.
No. 3 26" B. & S. for spur.
36" Walcott for spur.

GRINDERS

Yankee Drill.
Leland Universal, with power feed.
No. 23 B. & S. Gear Cutter.
8" x 30" Modern Plain (new).
14" x 20" B. & S. Plain.
Garvin hole grinder.
Gisholt tool grinder.
No. 5 Diamond water tool.
No. 16 Gardner disc grinder.
No. 24 Gardner disc grinder.

LATHES

13" x 5' P. & W., c.r., taper
14" x 6' Fairbanks, c.r. taper
16" x 6' Prentice, c.r.
18" x 8' L. & S. pat. head, c.r. taper
18" x 10' Fitchburg, c.r.
18" x 12' Barker, c.r.
20" x 14' Blaisdall, c.r.
21" x 12' New Haven, c.r.
24" x 13' New Haven, c.r.
32" x 16' Blaisdal, c.r.
36" x 20' American, t.b.g.
36" x 22' New Haven, t.b.g.
3½" x 60" Fitchburg Lo-Swing.

PLANERS

36" x 36" x 16' Sellers, one head.
36" x 36" x 12' Cleveland, open side, 3 heads and arranged for motor drive.
36" x 36" x 12' Detrich & Harvey, open side, 2 heads, one side head.
40" x 38" x 14' Putnam, one head.
40" x 40" x 12' New Haven, one head, one side head.
40" x 48" x 18' New Haven Planer, 2 heads, 2 extension heads.

SCREW MACHINES

1" B. & S. Plain.
16" P. & W. Plain.
No. 2 Foster, plain head.
No. 2 Costello, plain head.
No. 2 P. & W. friction head.
No. 3 Foster, geared head.
No. 4 Pearson, geared head
No. 3 Bardons & Oliver, plain head.
No. 1½ Garvin, friction head
¾" Cleveland, automatic

TURRET LATHES

16" Lodge & Shipley
25' Niles.
2 x 24" Jones & Lamson
1 x 36" Jones & Lamson, chucking equipment.
3 x 36" Jones & Lamson, bar equipment.
21" Gisholt, with taper.
2 24" Gisholt turret lathes, taper attachment.

PUNCHES AND SHEARS

No. 2 L. & A. Angle Iron Shears, 5"x5"x½ (new)
No. 5 L. & A. Double Punch & Shear, ⅝"x⅝", 3"x⅜", 1⅛ rd. (new).
No. 1 L. & A. Multiple Punch (new).
No. 2 L. & A. Multiple Punch (new)
No. 1 L. & A. Horizontal Punch, ½" in 1" (new).

MISCELLANEOUS

No. 2 Kempsmith Universal Miller.
50-lb. Bradley Strap Hammer.
100-lb. Bradley Helve Hammer.
¾" Acme Forging Machine.
52" Niles car wheel boring mill.
3" Stover Pipe Machine.
6" x 14" P. & W. Thread Miller.
No. 1 American Air Tempering Furnace.
Belt Lacing Machine.
3-ton Yale Duplex Hoist

Stocker-Rumely-Wachs Company, 117-121 N. Jefferson St., CHICAGO, ILL.

UNRESTRICTED PUBLIC SALE—BROOKLYN, N. Y., THE VALUABLE

Machinery and Equipment

OF THE

"Automatic Machine Products Co."

LOCATED IN THE

BUSH TERMINAL BUILDING No. 5

(Fifth and Sixth Floors) Entrance Thirty Fifth Street and Third Avenue

Tuesday, August 28th, 1917, commencing at 10.30 a.m.

COMPRISING

Power Punch Presses (59 in all) including V and O Model Nos. 2, 2½, 3, 4, 12½ and 24. Bliss make Nos. 16, 21, 21B, 34 and 52. Adriance Nos. 5, 24 and 224. Consolidated Nos. 4 and 35. Consolidated Nos. 4 and 5. Waterbury Nos. 370 and 373. Rockford, Erie, Ferracute and Pincer special presses and Mossberg screw press.
Cleveland Automatics (10s in all) Model A, two-inch capacity, latest type.

Milling Machines. (30 in all), Kempsmith No. 2 Universal Mills, Becker-Brainard No. 2 Plain Miller, Van Norman No. 0, Burke No. 3, Bristol No. 0 and Lees-Bradner Thread Miller.

Lathes. (40 in all) Le Blond 18", Pratt & Whitney 16", Garvin 1", Prentiss 12", Chard 16", Davis various sizes, Davis & Egan 16", Blount Prentiss and A.M.E. & Co. speed Lathes.

Screw Machines [illegible] Garvin make Nos. [illegible] and [illegible] wire feed and turret types.

Tapping Machines. (77 in all) Garvin No. 3, Harvey Hubbel Hercules, Richard & Shafer, Halstrom and Special Tappers.
Drill Presses [illegible] in all. Rockford Prentiss Barg [illegible] and 4 spindle type Fairbanks 4 spindle Barnham 3 and [illegible] spindle [illegible] 2 and 3 spindle.
Miscellaneous. [illegible] W. & T. [illegible] Dewitt graduating machine, exhaust and blower fans, tumbling barrels American pressure blowers, American Gas Co. annealing furnaces [illegible]
Electric Motors [illegible] K.W.
10,000 lbs. fine leather belting, 2,000 ft. various size shafting, steel [illegible]

Plant open for inspection week days until date of sale.

Directions to reach plant Take 3rd Ave. [illegible] from Manhattan [illegible] N.Y. get off at 36th St. Brooklyn, walk one block [illegible]

HIRAM H. PARKE, Auctioneer, Offices and Salesrooms, 924-926 Broadway, New York City

STEEL BUILDING CRANES

Can be seen in operation

Steel Building or Coal Shed, 108 ft. x 298 ft., maximum height 40 ft., containing approximately 450 tons of structural steel.

Two Brown Patent Bridge Tramways, hoisting and conveying apparatuses, consisting of a bridge tramway with tracks permitting a movement of 300 ft.; distance between movable piers 180 ft., with end cantilevers 92 ft. and 36 ft. Each bridge has in its house, Brown Patent Hoisting Engine with the most modern operating mechanism, together with all necessary fittings and connections for complete operation, together with six Brown Patent Automatic Self-dumping Coal Tubs of 42 cu. ft. capacity; two single rope buckets of 48 cu. ft. capacity; four skips of 2 ton capacity; and also automatic clam shell bucket. Both these outfits are practically in new condition.

New York Machinery Exchange, Inc.

50 Church Street . . . New York City

Rebuilt Machines For Sale

PLANERS

1—24x24x6 Powell.
5—Sellers 25x25x6'.
2—Sellers 25x25x8'.
1—Putnam 24x24x8' 6".
1—Wheeler Heavy 30x30x8' 6".
1—Lathe-Morse 24x24x5' 6".
1—New Haven 24x24x7'.
1—Putnam 42x40x12' 6".

GRINDERS

1—LeBlond Universal Tool and Cutter, power feed, same as new.
1—Bridgeport Plain Grinder, 16x36.
1—No. 3 Landis Universal Grinder.
2—No. 6X Diamond Double Disc Grinders.
1—Ford Smith Plain Grinder.

AUTOMATICS

1—1" National Acme Double Belt Type.
1—1¼" National Acme Double Belt Type.
1—No. 55 National Acme.
1—1" National Acme, four spindle.
2—No. 5A National Acme, four spindle.
3—2" Cleveland.
1—2¼" Cleveland.
2—2¾" Gridley Single Spindle Motors.
1—3¼" Gridley Single Spindle Motor.

LATHES

1—32x12' Draper Lathe, C.R., H.S.
1—30x8' Fitchburg, C.R., P.C.F.
3—16x8' Putnam, C.R., taper.
6—18x8' Porter, C.R., semi-quick, taper.
2—18x8' Davis, C.R., pan, pump, taper.
10—16x8' Greaves-Klusman, C.R., pan, pump.
9—20x6' Perkins Plain Turning, pan, pump.
1—14x6' Porter, C.R.
1—20x8' LeBlond, C.R.
1—13x5' Seneca Falls, C.R., pan.
14—20x6' Perkins Lathes, pan bed, chuck, Fay & Scott Turrets.

MISCELLANEOUS

1—No. 5 Becker Vertical Miller.
2—No. 310 Baker Drills.
1—No. 18 Bliss Press.
1—No. 1 Whiton Gear Cutter.
1—No. 4 Garvin Plain Miller.
1—No. 3 Kempsmith Plain Miller, same as new.
1—9" Industrial Works Slotter.
1—24" Aurora Sliding Head Back Geared Drill.
3—Premice 24" Sliding Head Drills.
2—Industrial 40" Drills.
1—Western Hydraulic Banding Machine.
1—Jenckes Band Turning Lathe, with 3" Universal Chuck.
1—36" Aurora Drill.
1—12" Bement Travelling Head Shaper.
1—Sellers Slab Miller, 24x21x12'.
1—No. 21 Lee-Simplex Saw.
1—36x10 Cincinnati Gear Cutter.

This is only partial list—Send for full list

Simmons Machine Company, Inc.

NEW YORK, 1001 Singer Bldg., Telephone Cortlandt 6575
ALBANY, N. Y., 985 Broadway, Telephone Main 4876

Single Purpose and Shell Lathes

22—18" x 8' Battle Creek Lathes, single back gear, 2-step cone with counter shaft.
6—18" x 9' Chard Lathes, 3-step cone, double back gear, compound rests, semi-quick change with face plates, steady rests and counter shafts.
3—20" x 8' Mershon Lathes, 3-step cone, double back gear, compound rest and counter shafts.
4—20" x 8' Oakley Lathes, 3-step cone, double back gear, compound rests with oil pumps and pan and counter shafts.
1—20" x 10' Oakley Lathe, 3-step cone, double back gear, compound rests with oil pumps and pan and counter shafts.
4—20" x 8' Bullard Projectile Turret Lathes.

If you can use all or a part, we will be pleased to have you communicate with us promptly.

EAST DAYTON MACHINERY COMPANY
Dayton, Ohio

c8m

Long Distance is Calling!

Telegrams and Long Distance Telephone Messages are not uncommon among the replies to ads in our Classified Advertising Section.

LOOK—HERE THEY ARE

BORING AND TURNING MACHINES—VERTICAL

1—30" Bullard, 1 turret head.
1—30" Flather, one turret head.
1—New 36" Gisholt, September delivery.
1—New 36" Rogers, one turret head Sept. delivery
2—36" Bowen & Sharpe one turret head Dec. delivery.
1—37" Niles, one swivel, one turret head
1—42" N.B.P., two swivel heads, motor drive.
1—52" Niles, two swivel heads.
1—80" Niles, two swivel heads, floating attachment.
1—81" Sellers, one head.
1—New 84" Bickford, December delivery.
10—Niles 2 heads, December delivery.

BORING MACHINES HORIZONTAL

1—No. 1 Barrett Cylinder Borer, 36" bar type.
1—No. 2 24" Barrett, two side facing heads.
1—Heller Horizontal Drill or stud Borer, with 1 12 90° spindle, vertical adjustment 60", horizontal adjustment 60", size of table 30" x 48".
1—Lucas, 2¾" bar
1—Newbrough 4" bar 84" swing 20" feed

BULLDOZERS

1—No. 8 Ajax, 20 H.P. motor drive
1—New No. 4 Garrison same as No. 4 Williams Whitel
1—No. 7 High speed Ajax 36" stroke

COMPRESSORS—AIR.

1—8" x 8" Gardner, belt driven.
1—Ingersoll Sargent Duplex, 7 x 14½ x 8".
1—Cincinnati Cross Compound, two stage, 700 cu. ft.
1—16" x 12" Chicago Pneumatic belt driven
1—16" x 16" x 16" Single Cylinder Smith Valle, steam driven.
1—22" x 17" x 16" Ingersoll Rand, motor driven.

CRANES.

20-ton Alfred Box Electric Traveling Crane, 40' span.
25-ton Browning Electric Traveling Crane, 40' span
1—Locomotive 36" 1-com. standard gaged, steam driven

CUTTING OFF MACHINES.

2—No. 00 Brown & Sharpe
1—2" capacity Warner & Swasey
4—3½" Hall
10—4½" Williams.
3—4" Curtis & Curtis.

DRILLING MACHINES—RADIAL.

2—New 2' American gear drive.
1—3' Bickford, semi-universal table.
1—3' Bickford gear drive.
3—New 3' Americans, sensitive tapping attach.
4—New 3' Prentice belt driven
1—New 3' Moeller plain speed box head
1—New 3½" Western Dre 40" cycle
2—4' Moeller plain speed box drive.
1—5' semi-universal American
5—New 5' Baush Plain.
1—5½" American, full Universal.
1—6' Baush Plain, same driven.
10—New 6' Triumph, motor drive: Sept. del.

DRILLING MACHINES—HEAVY DUTY

2—New No. 2 Cullman.
3—New 24 Cullmann, 24" swing, capacity 2" in solid steel.
2—24 Cullmann, plain table.
4—New 700 Baker single pulley drive, late type.

DRILLING MACHINES—MULTIPLE SPINDLE

4—New Leland-Gifford sensitive four spindle
1—New 36" Bench, 12 spindle, capacity 1½" holes, 30" circle.
1—14 spindle Bench, capacity 1" holes, 36" circle.

GEAR CUTTING MACHINES

1—No. 1 Whelen.
1—No. 3 Bickett Gear Rack Planer, delivery 60 days.
1—No. 3 Brown & Sharpe Auto. Gear Cutter, Spur.
1—New 8" Standard Gear Cutter Spur.
1—52" Gleason Bevel Gear Planer.
1—36" Gleason Bevel Gear Planer.
1—16" Robinson Bevel Gear Generator
1—8" Grant-Lee Gear Hobbler.
1—No. 1 4" Sellers Bench & Speeder Gear Hobber
1—20" x 2 6 A. E. Spur and Bevel Cutter
1—10" Fellows Gear Shaper.
1—24 x 8" G. & E. for Spur and Bevel
1—24" Becker Bevel.
1—New No. 10 Whelen Bevel 20" Spur M.
1—36" Fellows Gear Shapers.

GRINDERS—UNIVERSAL FOR CUTTERS, DRILLS, REAMERS ETC.

1—LeBlond Universal, one year old.
1—No. 1 Universal
1—New No. 1
1—New Walker No. 1 motor B
1—New Walker No. 1 motor K
1—New Wadsworth & Mosman, style B&K
1—No. 10 Wells
1—Gisholt No. 5, 12".

GRINDING MACHINES—CYLINDRICAL—PLAIN.

1—6" x 18" Pratt & Whitney.
1—New No. 12 Brown & Sharpe 6" x 36" Sept. delivery

1—New 10 x 36" Landis, immediate.
1—New 36" x 36" Norton, Sept. delivery.
1—New 10" x 30" Norton, Sept. delivery.
1—10" x 60" Landis.
1—New 10 x 72 Norton, Plain.
20—12" x 24" Modern, self-contained.
1—12" x 30" Landis, rebuilt.
6—12" x 36" Modern, self-contained, motor or belt driven.
3—12 x 42" Landis, self-contained.
6—12" x 48" Modern, self-contained, motor driven.
1—14" x 6" Landis, with crank grinding.
1—18" x 96" Brown & Sharpe.

GRINDING MACHINES CYLINDRICAL UNIVERSAL

1—Brown & Sharpe No. 13, 8" x 36".
2—New No. 2 Rech, 9" x 20".
1—New No. 3 New Walker, 9" x 36".
1—No. 14 (30" x 30") Landis.
1—New No. 2½ (10" x 36") Bath.
1—10" x 6" Modern.
9—New No. 2 Morse, cap. 12" x 2", Universal, Now delivery
1—New 3 (12" x 96") Brown & Sharpe.
1—12" x 42" Landis.
2—New No. 3 Modern 15" x 96" Sept. delivery

GRINDERS—INTERNAL.

1—No. 1½ Landis.
1—No. 70 Heald.
1—No. 75 Heald.

GRINDERS—CYLINDER.

1—No. 2 Brown & Sharpe.
1—No. 60 Heald, single pulley drive.

GRINDERS—PROFILE.

1—New Cleveland.

GRINDING MACHINES—RING.

1—New No. 4 Beasley, tweaving chucks.
1—24" Heald.
1—No. 250 Heald.

GRINDING MACHINES SURFACE.

1—New No. 1 Wadsworth & Mosman.
1—No. 1 Diamond, capacity 12" x 24" x 24", automatic
2—New No. 1½ Walker's complete.
1—New No. 2 Reid same as B. & S.).
1—New No. 2 Brown & Sharpe

HAMMERS—POWER FORGING

1—400-lb. Bradley Helve
1—250-lb. Bradley Helve, upright.

HAMMERS—BOARD LIFT DROP.

1—400-lb. Billings & Spencer.
1—1,000-lb. Chambersburg.

HAMMERS—STEAM FORGING.

1—Used 4,000-lb. Niles Single Frame
18" Morgan & Wilcox 600 to 800 lbs. 24" gate.
2—New 1,000-lb. Bay Standard Gentle, Single Frame.
1—800-lb. Bell, Sept. delivery.

KEYSEATERS.

2—No. 0 Metts & Merrill.
1—No. 2 Metts & Merrill.
1—6" stroke Compton Knowles Broacher.

LATHES—MANUFACTURING—NOT SCREW CUTTING.

2—New No. 3 Harding Brothers Bench Lathe.
14—Reed Prentice Shop Lathes, for 4" or 18 lbs American shells.
20—New Simplex, 16" x 8'.
3—No. 5X Reed Prentice semi-auto mate.
40—14" x 6' Reed Stud and Bolt.
2—24" x 8' Hendey Machine, quick duty.
16—16 x 8 Simplex, Single Pulley Drive.
22—18" x 8' Battle Creek, heavy duty.
5—20" x 8' Monarch.
50—20" x 10' Hendman, high duty.

LATHES ENGINE.

8—Wash Precision, Sentinel drive.
6—New 12 x 4 Shepard reverse head
5—New 12 x 6 Shepard reverse head.
1—New 14 x 6 Shepard reverse head.
1—24" x 6 Bradford taper attachment.
1—New Harding Brothers 25" Precision Lathe.
1—New 60 x 8 Cleveland Two Rests Lathes, complete equipment.
2—20" x 6' LeBlond pan bed, quick change gears, taper attachment.
1—16" x 4 Lodge & Shipley geared head taper
1—20" x 5' Diehl.
1—New 24 Hendey quick change gear, 10" chuck
1—20" x 8 LeBlond heavy duty.
2—37" x 8' Lodge & Shipley quick change gear
1—New 37" x 8' Monarch heavy duty.
2—New 27" x 10' Prentice single V geared.
1—New 22" x 8' Monarch double back geared Q.C.G.
1—22" x 10' Prentice 3 jaw turret.
1—24" x 10' Reed
1—24" x 12' S. & B.
1—New 24" x 12' Monarch 4 jaw Lodge & Shipley geared head.
1—24" x 10' Prentice quick change geared head, 10" chuck

1—24" x 6" x 22" McCabe double spindle.
1—20" x 30" New Haven.
4—27" x 8' Patent Head Lodge & Shipley, double back geared.
1—28" x 12' New Haven, single back geared.
1—28" x 12' Schumacher & Boye.
1—New 32" x 12' Pittsburg pattern.
1—New 36" x 24' Putnam triple geared.
1—36" x 12" American, sizing blocks to 63".
1—36 x 19' Stephen, single back gear.
1—48" x 22" Betts triple back gear.
1—60 x 27' Betts, triple back gear.
1—New 60" x 30" Putnam, Dec. delivery.
1—72" x 30' Fitchl, triple geared.

LATHES—TURRET

1—2 x 24 Jones & Lamson.
1—3 x 30 Jones & Lamson.
1—6A Pratt & Johnson.
1—New 2" Gisholt.

MILLING MACHINES KNEE TYPE UNIVERSAL

1—No. 2 Kempsmith, lowering head
1—No. 2 Kempsmith, vertical attachment
1—New Kempsmith.
1—No. 2 Hendee Norton.
1—No. 2 Kempsmith back geared
1—No. 2 New Cincinnati.
1—New No. 2 Hedelond Sept. delivery
1—New No. 2 Kempsmith
1—New No. 2 Becker, August delivery.
1—New No. 4 LeBlond heavy belt, immediate.
1—No. 4 Cincinnati, with vertical attachment.

MILLING MACHINES KNEE TYPE PLAIN

1—No. 1 Pratt & Whitney.
1—No. 1 Brown & Sharpe.
2—New No. 1 Kempsmith.
2—New No. 1½ American, back gear.
1—New No. 2 Bickford.
1—New No. 2½ LeBlond, August delivery.
1—No. 1 LeBlond
1—No. 1 Kempsmith.
1—No. 4 Garvin

MILLING MACHINES VERTICAL.

1—New Brokett, No. 0.
1—New No. 4B Becker
1—No. 3 Becker.
1—No. 3 Brown & Sharpe

MILLING MACHINES PLANER TYPE.

1—No. 2 Beaman & Smith, vertical spindle, open side
1—Universal Swivel Milling Machine, 9" table 42" x
1—New No. 4 Beaman & Smith, vertical spindle, open side, swiveling surface of table 18" x 24", reversible housing on one side

PLANERS

1—36" x 24" x 6' Gray one head on cross rail.
24" x 22" x 8' Cincinnati, one head used three months.
1—36" x 36" x 8' Gray, one head on cross rail
1—36" x 36" x 8' Gray Planer, one head.
1—42" x 36" x 12' Cincinnati two heads.
1—48" x 48" x 12' New Haven, one head
1—New 26" x 24" x 12' Bickett, one head, Nov.
1—New 26" x 26" x 12' Bickett, one head, Dec. delivery additional heads if desired.
2—New 60" x 36" x 12 Woodward & Powell two heads on cross rail, one side head; Oct. delivery.
1—42" x 36" x 12' Gray, two heads
1—New 36" x 36" x 24 Sellers, four heads
1—New 42" x 42" x 16' Niles, four heads.
1—Gray 42" wide rail 8' 36" x 42" x 16 two heads
1—48" Cleveland Rotary Planer.
1—New 42" x 42" x 12' Bickett, one head New
1—New 48" x 48" x 16' Bickett, one head two side heads
1—48" x 48" x 16" Sellers, one rail head two side heads
1—54" x 54" Powell, one head.
1—72" x 60" x 16' Betts two heads right angle drive

[illegible]

SCREW MACHINES AUTOMATIC

[illegible]

SHAPERS

[illegible]

W. F. DAVIS MACHINE TOOL COMPANY

CHICAGO, ILL. 549 Washington Bldg. | CINCINNATI, OHIO 1018 Union Central Life Bldg. | CLEVELAND, OHIO 508 Leader News Bldg. | NEW YORK CITY Singer Bldg.

WRITE OR WIRE OUR NEAREST OFFICE FOR QUOTATIONS
THIS IS ONLY A PARTIAL LIST OF AVAILABLE MACHINES

If any advertisement interests you, tear it out now and place with letters to be answered.

ReMANUFACTURED
—(ORIGINATED BY US)—
MACHINE TOOLS

You Can't Buy Them Elsewhere

Very Latest Models—None Over 2 Years Old

TURRET MACHINES

25—21″ Gisholts, 3½″ hole, 2-step, 5″ belt,
20—21″ Gisholts, 3½″ hole, motor arrangement,
13—24″ Gisholts, 4¼″ hole, 3-step, 4″ belt,
38—24″ Gisholts, 6″ hole, 2-step, 6″ belt,
41—24″ Gisholts, 6″ hole, motor arrangement,
2—2¼″ x 26″ Greenlee Flat Turrets,
2—2½″ x 26″ Pratt & Whitney Gd. Hd. Turrets,
4—3-A Warner & Swasey (bar machines).

ENGINE LATHES

24—22″ x 8′ Hamilton, D.B.G., C.R., Semi-Q.C.,
5—22″ x 8′ Hamilton, D.B.G., Turret tool post,
4—22″ x 8′ Davenport, D.B.G., Turret tool post,
7—22″ x 10′ Hamilton, D.B.G., C.R., Semi-Q.C.G.,
2—22″ x 10′ Hamilton, D.B.G., turret tool post, Semi-Q.C.G.,
20—22″ x 10′ Davis, D.B.G., C.R., Q.C.G.,
8—24″ x 10′ Lodge & Shipley, D.B.G., C.R., Q.C.G.,
8—24″ x 10′ Lodge & Shipley, Selective Gd., Hd., C.R., Q.C.G.,
11—26″ x 10′ American, D.B.G., C.R., and carriage turret,
2—26″ x 10′ American, D.B.G., carriage turret,
19—26″ x 12′ Putnam, carriage turret, semi-Q.C.,
9—26″ x 12′ Putnam, C.R., Semi-Q.C.,
2—26″ x 12′ Wickes, D.B.G., C.R., Semi-Q.C.G.,
10—28″ x 10′ Niles, Bement, Pond, D.B.G., Q.C.G.,
4—28″ x 14′ Lodge & Shipley, Select. Gd. Hd., motor drive, C.R., turret and taper.
3—30″ x 16′ Lodge & Shipley, D.B.G., C.R., turret and taper,
10—40″ x 18′ Pittsburgh, triple geared, Q.C.G.

PLANERS

1—76″ x 48″ x 18′ Woodward & Powell, 3 hds.
1—48″ x 48″ x 16′ Pond, 2 hds.
1—32″ x 32″ x 10′ Gray, 2 hds.
1—32″ x 32″ x 8′ Gray, 2 hds.
1—30″ x 30″ x 7′ Powell, 4 hds.
1—26″ x 26″ x 7′ Gray, 1 hd.
1—26″ x 26″ x 6′ American.
1—24″ x 24″ x 10′ Lodge & Davis.
1—24″ x 24″ x 6′ Cincinnati.
2—24″ x 24″ x 5′ Gray.
1—24″ x 24″ x 4′ Gray.
1—22″ x 22″ x 6′ American.
1—22″ x 22″ x 5′ Flather.

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4—P. & W. 2-spindle Rifle Barrel Drilling.
1—2-spindle Beaman & Smith Cylinder Boring.
1—No. 4 Newton 2-spindle, 4″.
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2—34″ swing Colburn.
1—32″ swing Rogers.
1—30″ swing Baush.

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1—3½′ Gang.
1—3′ Mueller.
1—3′ Prentice.
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4—2½′ Fosdick.

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1—No. 25 Becker Plain.
1—No. 1½ Brown & Sharpe Universal.
1—No. 20 Oesterlein Universal.
1—No. 3 Brainard Plain.
2—No. 5 Brainard.

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Col. MacLean was in Germany When War Broke Out

HOW he got out, what he saw, heard, learned and concluded, he tells in the August number of MACLEAN'S MAGAZINE. Colonel MacLean knows Europe thoroughly. He knows high-up men in all the great political and commercial capitals of Europe—diplomats, bankers and great merchants. These men told him freely and plainly many startling things about Germany and her intentions.

In a contribution of truly sensational interest, abounding in most startling facts, Colonel MacLean points out "The Dangers Ahead." His aim is to arouse Canadians out of their unwarranted confidence and out of their content. You will find in this article by Colonel MacLean strange, even shocking revelations, and things hard to believe—and you ought to read "The Dangers Ahead" in order that you may help in their avoidment by Canada and her people.

MacLean's for August Is a Midsummer Number

The August MACLEAN'S is excellently balanced, as you will see from these contents:

CONTENTS

The Dangers Ahead. By John Bayne MacLean.

The Menace of Canadian Titles. By Joseph Martin, M.P.P.

Rev. C. A. Eaton—A Canadian Who Speaks Out. By Beatrice Redpath.

Frenzied Fiction for the Dog Days—(Done by the Dipperful.) By Stephen Leacock.

The Human Side of Conscription. By H. F. Gadsby.

Winning the War in the Air. By Agnes C. Laut.

A Circus Story. By L. B. Yates.

Mam'selle Butterfly. By Arthur Beverly Baxter.

The Captain of the Susan Drew. By Jack London.

An Andy Doolin Yarn. By Hopkins Moorhouse.

A Detective Story. By Robert E. Pinkerton.

The Gun Brand. By Jas. B. Hendryx.

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Women and Their Work—A New Department. Review of Reviews—Regular Department.

Yates who writes the Circus Story, was born in Hamilton. He wrote those stories about Paragon Pete and The Singin' Kid in the Saturday Evening Post.

Leacock is excessively humorous in his Dog Days Sketch, in which he talks about summering and simmering.

Miss Laut fancies that the war may be won by the birdmen, and if Uncle Sam produces 100,000 planes, she may be right.

Gadsby sits in the Press Gallery at Ottawa, and writes brilliantly always. His "Conscription" article is in order.

Pinkerton who writes the detective story, "Old Twilight," knows how to write this class of story.

By the way, Lord Northcliffe has promised an article for the September MACLEAN'S.

You can see that MACLEAN'S for August is just the right type for August.

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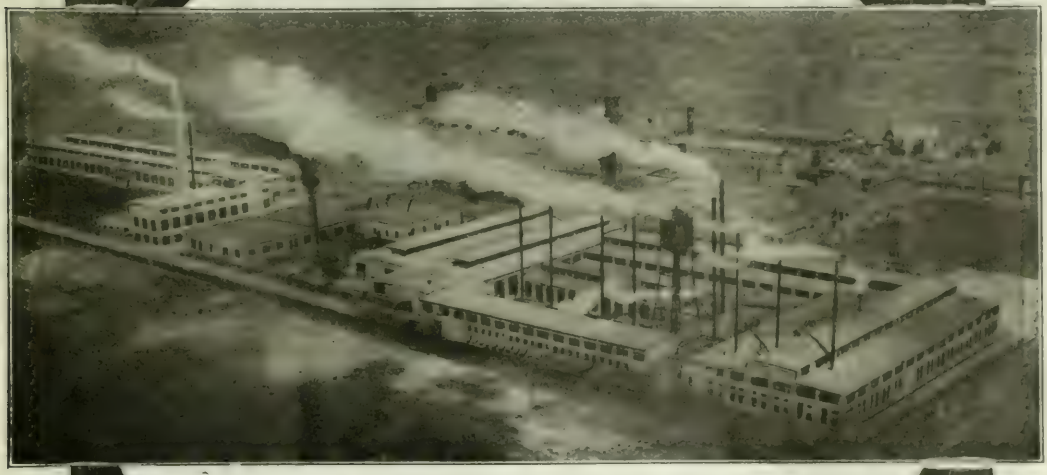

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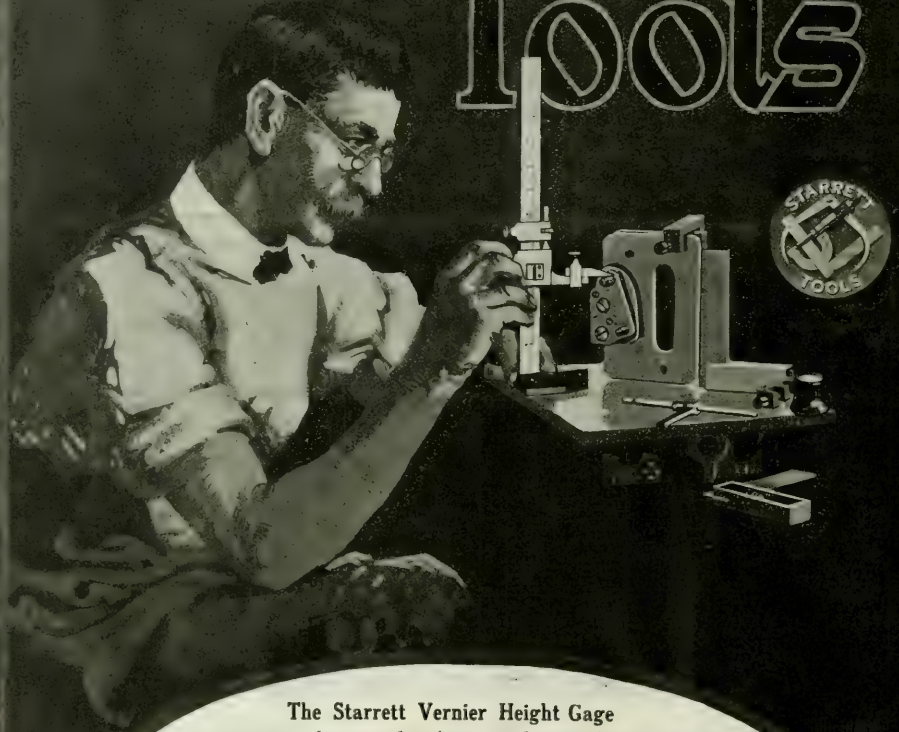

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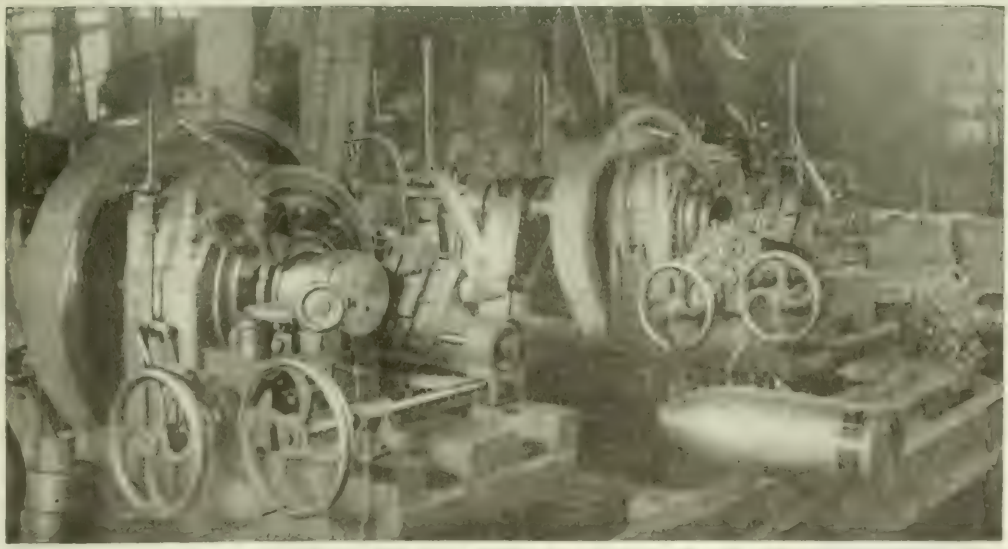

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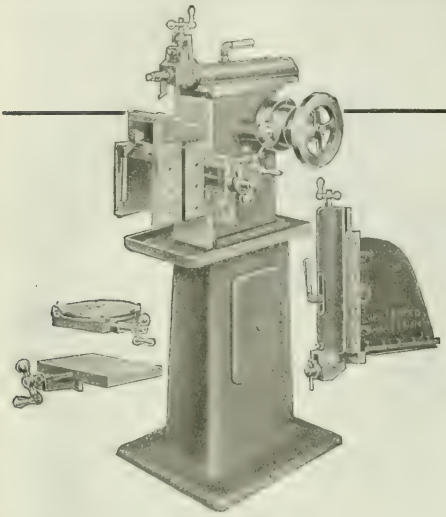

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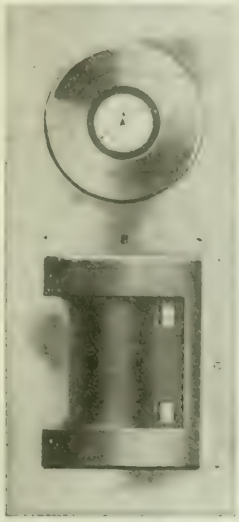

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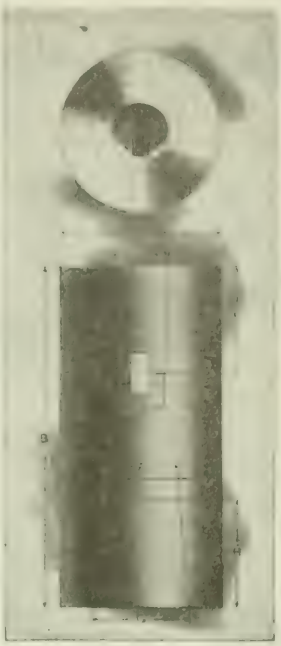

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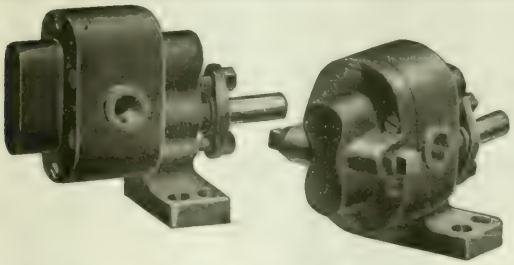

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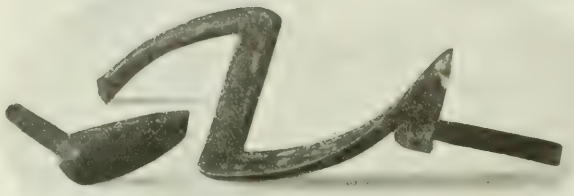

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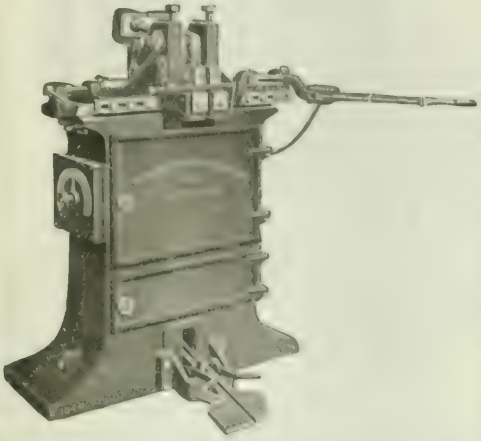

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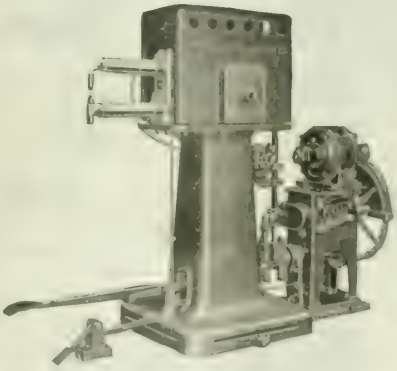

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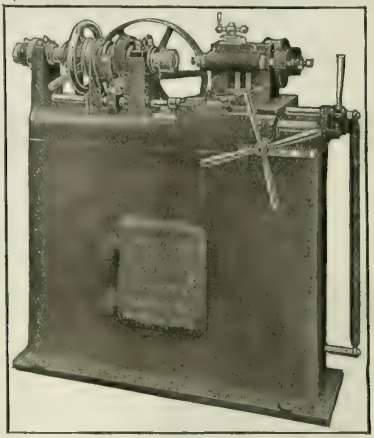

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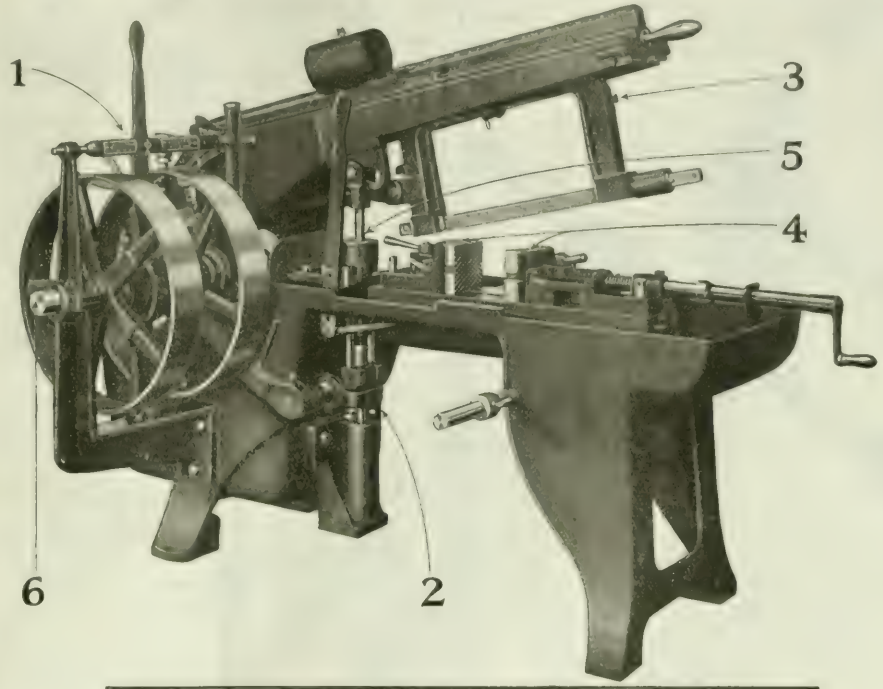

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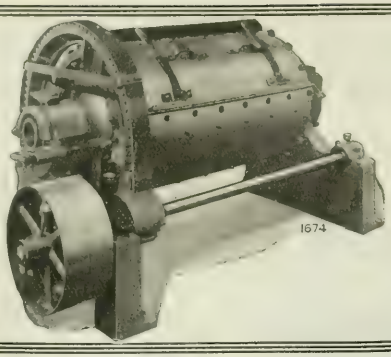

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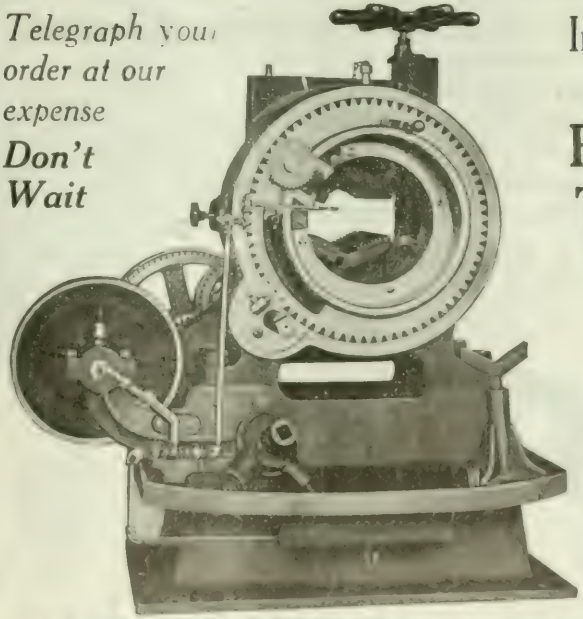

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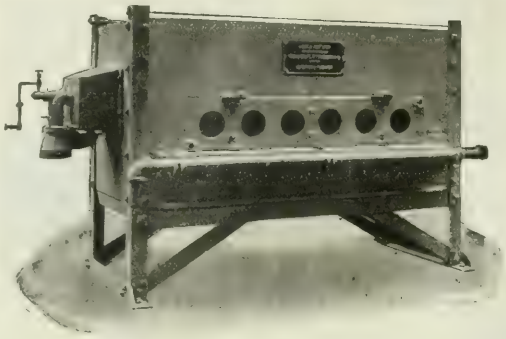

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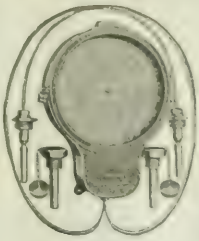

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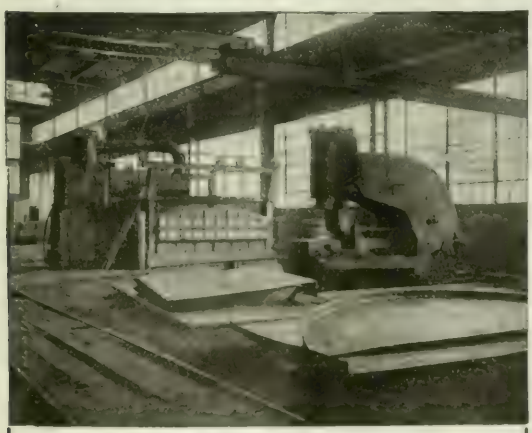

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TATE-JONES & COMPANY, Inc.
Pittsburgh, Pa. Furnace Engineers

TYPE E-4

Two G. & B. Furnaces

from a stock of over 100 types and sizes —a furnace for every purpose. And at present we are making immediate deliveries on nearly all types.

With a Gilbert & Barker furnace you are assured of efficient and economical heat-treating, annealing, hardening, etc. Our half century of experience with liquid and gaseous fuels for heat treatment of metals makes us confident of our ability to solve your heat-treating problems. Put them up to us.

Catalog 24 describes the complete line.

Gilbert & Barker Mfg. Co.

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Did you ever notice somebody starting a conversation in a low voice with the two words "They say"? The moment you hear it you know it is gossip, scandal, and most likely a lie. But when you hear everyone saying that HARRIS HEAVY PRESSURE is the best BABBITT METAL they can use for all general machinery bearings, isn't it about time to believe them?

Send to our nearest factory for a trial box.

Manufactured and guaranteed by

The Canada Metal Company, Limited

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"W & B" Pipe Wrenches the Only Pipe Wrenches

MADE IN CANADA

The line comprises all sizes from 6 to 48 inches

"W & B" Wood Handle Grips. Length open 6 to 14 inches

"W & B" STEEL Handle Grips. Length open 18 to 48 inches

These Wrenches are extra strong frames well proportioned.

The Jaws are Drop Forged and tempered, giving them strength to resist the most severe strains.

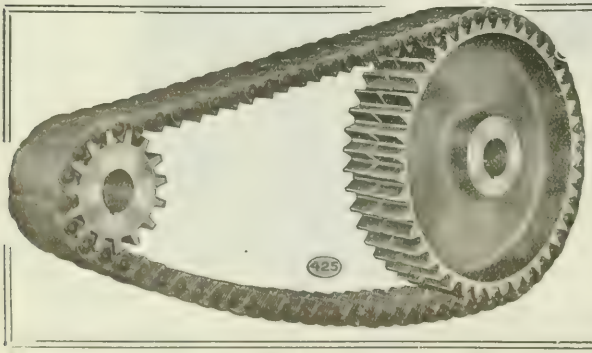
Other patterns of "W & B" SCREW WRENCHES MADE IN CANADA at our St. Catharines factory, are our Machinists' Knife Handle, "Railroad Special," Regular (Agricultural Pattern). Adopt this established line as your standard CANADIAN-MADE WRENCHES.

Complete information and catalog No. 90 on request.

The Whitman & Barnes Manufacturing Company

ESTABLISHED 64 YEARS

ST. CATHARINES, ONT.



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The proven efficient form of Power Transmission.

PATENT SILENT

Equally suitable for main shaft or machine drives. Save space and power, increase output and ensure durability.

Chain and Parts Carried in Stock.

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DOUBLE BALL BEARINGS

Chapman Double Ball Bearings fit any adjustable hanger and the change can be made with but little delay to you.

Used in over 2,000 Canadian Factories. They have other good points too. Ask us to send full details.

The ordinary line shafting consumes from 15 to 60 % of power developed—

But the line shafting that's equipped with Chapman Double Ball Bearing will save 75 per cent of the friction loads making an average total saving of power from 15 to 30 per cent.

The Chapman Double Ball Bearing Company of Canada, Ltd.
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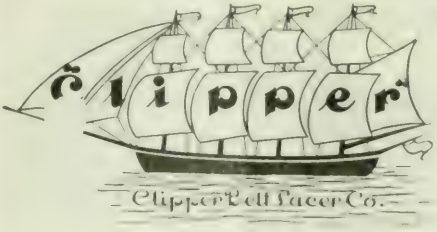
TRANSMISSION BALL BEARING CO., Inc.
1050 Military Rd., Buffalo, N. Y.

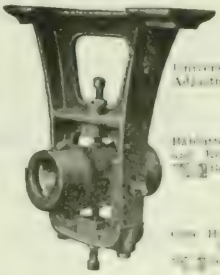


If you would use a stop watch while one of your belt lacing crews were at work you would find that you were paying expert men for a half hour job when any machine operator can lace a belt in THREE minutes with the

CLIPPER BELT LACER

CLIPPER BELT LACER COMPANY
976 Front Ave., N.W. Grand Rapids, Mich.

Speed Up—



IN Way Three you should get all the speed out of your machines possible.

You can do this by using BOND Hangers. Then the one way to get a BOND Hanger on the job is there saving your oil, your power, and your patience.

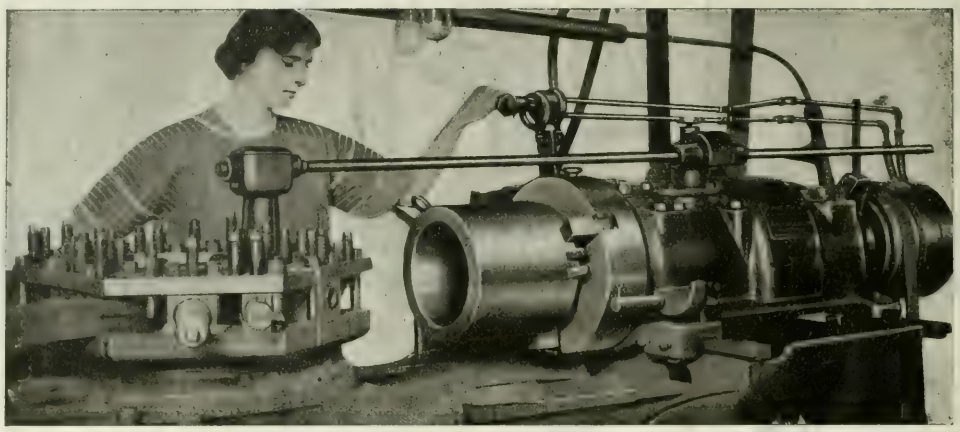
It is an investment that yields a steady return with every revolution of your shafting.

The [illegible] running without vibration. Its design permits full accessibility for adjustments or erection.

[illegible] make in the line of power appliances.

Your files are not complete without it.

CANADIAN BOND HANGER & COUPLING CO.
Limited
ALEXANDRIA ONTARIO



Some Points About Chucks

STRENGTH and quality are points possessed by most chucks probably not in such a pronounced degree as the Hannifin, but these qualities are generally found. They form some chuck's only argument. With the Hannifin these points are important, yet not the most important. Convenience, utility and life are additional points that decide the profit or loss in the use of a chuck.

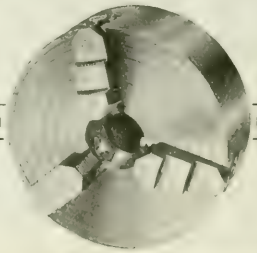
The advent of women into the mechanical field was viewed with an easy mind by those who had the Hannifin Chucks installed. Their labor and time-saving devices greatly aided the novice.

Your chucking needs will be amply taken care of. Your production will show a marked increase. Your product show a marked improvement. Our catalogue will show you how this chuck affects these changes.

Hannifin Manufacturing Company

Chicago, Illinois, U.S.A.

Representatives: The Canadian Fairbanks-Morse Co., Montreal. European Representatives: Coats Machine Tool Co., London; Fenwick, Freres & Co., Paris; Iznosskoff & Co., Petrograd.



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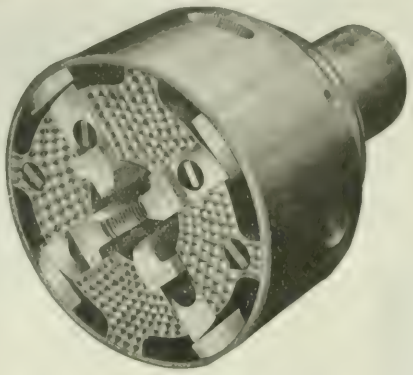
CUTTING THREADS AUTOMATICALLY

The NAMCO Self-Opening Die, illustrated, is an example of up-to-the-minute tool equipment which is putting thread-cutting on a better and more profitable basis.

This Die is designed for work on machines where the tool revolves. It is fully automatic and is built to stand the heavy cutting strains imposed by automatic machinery without injury to either the tool or the work.

NAMCO Dies are threading thousands of parts daily in our factory. Let us show you what they can do for you.

Ask for Thread-Cutting Book "M."



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If interested in Steam-driven Machines convertible to belt drive when required, ask for Bulletin K-302.

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"Time is of the Essence of the Contract"

as a rule, in these days of intensified production.

Compressed Air Appliances are, beyond question, among the greatest time savers of the period, and modern workshops however small, cannot afford to be without them.

The Compressor shown in the cut is particularly adapted to the needs of the small or medium size foundry or machine shop.

Note the simple design, and dust-proof construction. The machine is fitted with "Corliss" leaf valves and automatic splash lubrication. These mean efficiency and economy and the minimum of attention while running.

Bulletin K-300-A will tell you why. Please ask for it.

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IMPROVED
Drill Chuck

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By Sheer Merit

Jacobs Improved Drill Chucks are recognized as the STANDARD the world over. Once tried—always used.

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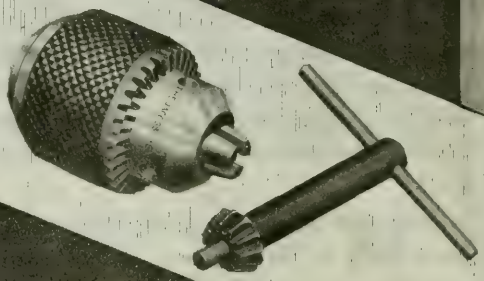
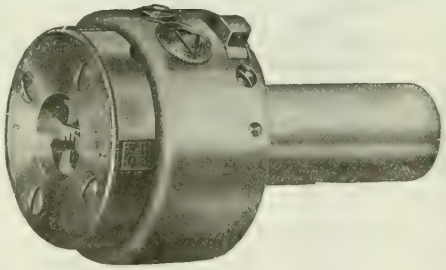




Automatic Die Heads

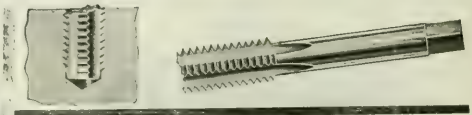
The chasers are set and held in place by a steel cam which, when adjusted, locks, no stopping or changing necessary.

The quick release will allow cutting right up to a shoulder when necessary.

These features are distinctly an H. & G. Automatic Self-Opening Die Head quality that makes it desired among other tools of similar nature.

We will gladly furnish you with our booklet.

Eastern Machine Screw Corp.
New Haven, Conn., U.S.A.



Has This Happened to You?

More than likely it has—often. And when it does do you fuss around trying to get hold of the broken pieces, injuring the threads, wasting time and temper?

If you do, the Walton Tap Extractor will be a welcome addition in your tool chest. With it a broken tap presents no difficulties and makes little lost time. The crucible steel fingers of this strong device go down into the flutes and it is then a simple matter to back the tap out by applying a wrench to the squared outer end of the tool. The thread is uninjured in the process, the casting or forging is saved and an otherwise nasty job has been handled without trouble or loss of time.

The Walton Company
Hartford, Conn.

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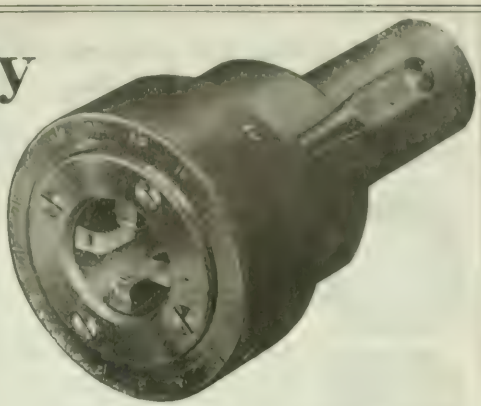
Users of Murchey Tools Get Chasers Without Delay



Lightning deliveries—that is a big advantage of using Murchey Tools. No work held up for chasers. We get your order, fill it, and it's on the way back to you just as quickly as the most rapid means of transportation can bring it to you.

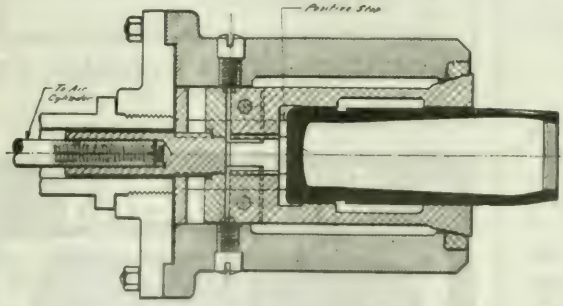
There is no service like the Murchey service, and there are no tools like the Murchey Tools. Send blueprints for estimates.

MURCHEY TAPS are accurate and simple and can be worked with great speed. On 4.5 Mark VII shells Murchey tapping time is just ONE MINUTE.

Murchey Machine & Tool Company

75 PORTER STREET - - - DETROIT, MICHIGAN

The Coats Machine Tool Company, Ltd., Caxton House, Westminster, London, S.W., England, Glasgow, Newcastle-on-Tyne, and Fenwick Freres & Company, 15 Rue Fenelon, Paris, France.



Consider Just This One Feature of M.E.C. Air-operated Hinged Collets

They save from 50 per cent. to 90 per cent. of the time usually required to do the same work by an ordinary chuck. While they **possess many** other points of superiority, the above feature alone is one that should appeal to users of chucks.

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insure safety. They also protect themselves because of their patented construction. The dove-tailed design of wrench and screw contracts the metal under pressure. The harder you twist the wrench the more the metal of the screw is compressed.

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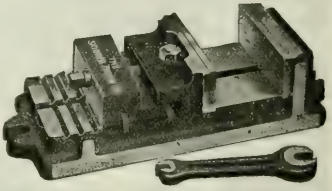

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We are well equipped to make all kinds of steel castings, 100 lbs. to 50,000 lbs.

Dominion Steel Foundry Co.
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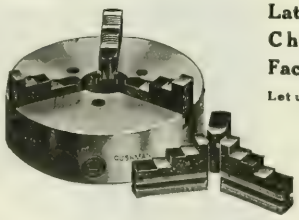

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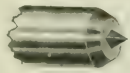

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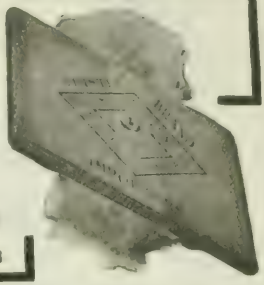

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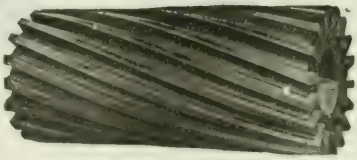

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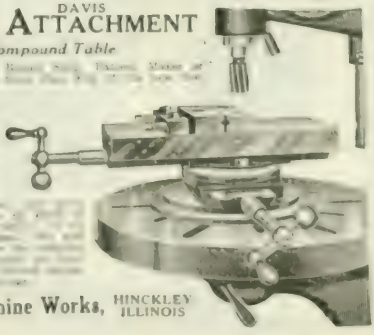

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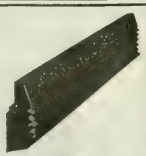

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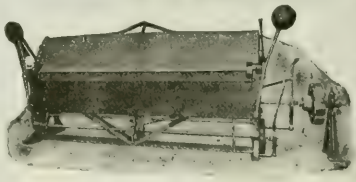

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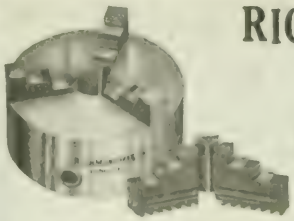

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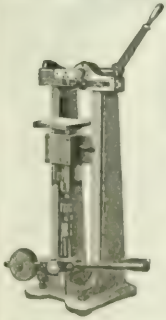

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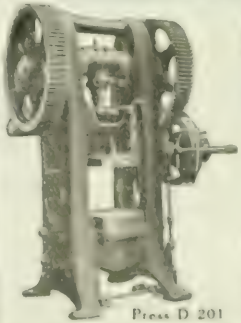

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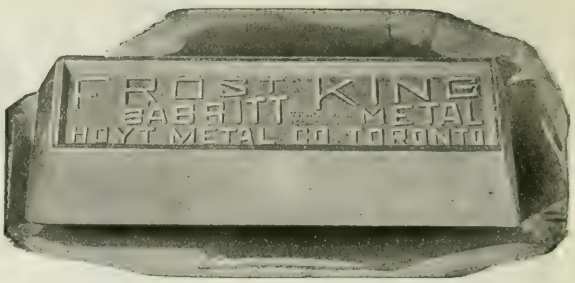

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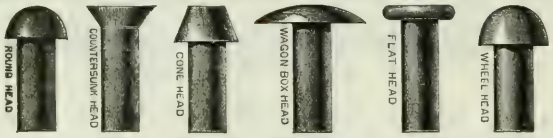

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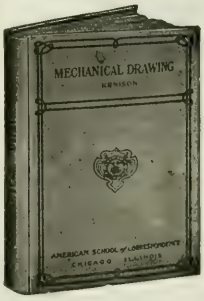

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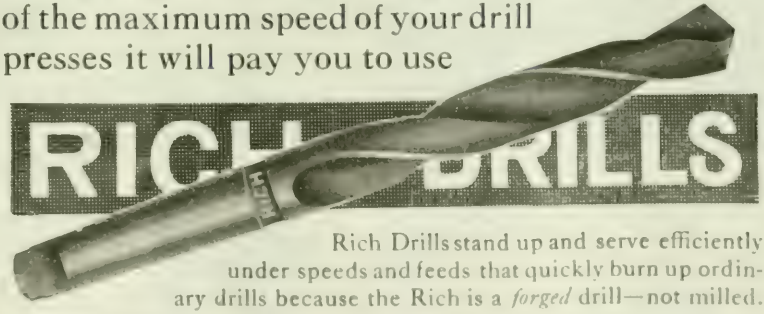

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Garlock-Walker Machinery Co., Toronto, Ont.
Henry & Wright Mfg. Co., Hartford, Conn.
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Morse Twist Drill & Machine Co., New Bedford.
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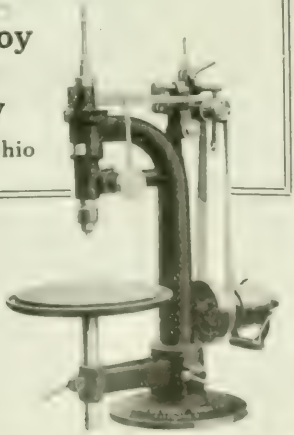

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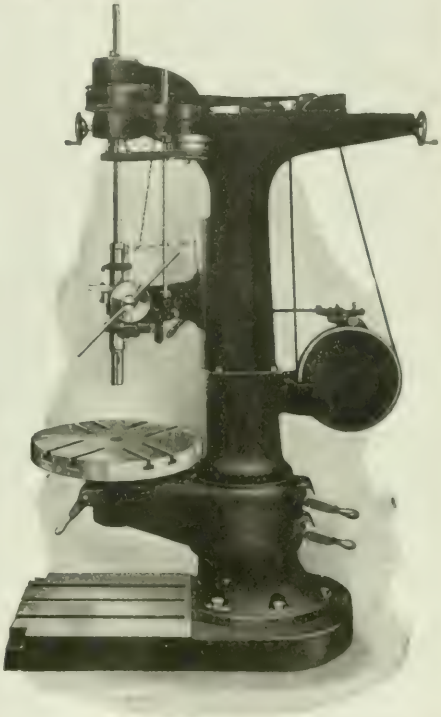

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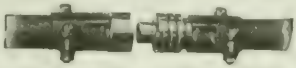

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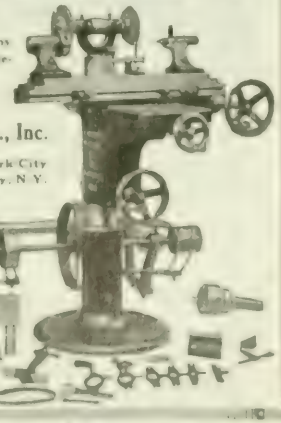

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Garlock-Walker Machinery Co., Toronto, Ont.

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Metchard Appliance Co., Ottawa, Can.

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Carter Welding Co., Toronto, Ont.
L'Air Liquide Society, Montreal, Toronto.

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National Acme Co., Cleveland, Ohio.

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National Machy. Co., Tiffin, O.
Petrie of Montreal, Ltd., H. W., Montreal, Que.

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National Machy. Co., Tiffin, O.
Petrie of Montreal, Ltd., H. W., Montreal, Que.

NUT FACING AND BOLT SHAVING MACHINES
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National Machy. Co., Tiffin, O.
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Victor Tool Co., Waynesboro, Pa.

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Canada Machinery Corp., Galt, Ont.
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Greenfield Tap & Die Corp., Greenfield, Mass.
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John H. Hall & Son, Brantford.
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Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
Hamilton Machine Tool Co., Hamilton, Ohio.
Niles-Bement-Pond Co., New York.
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H. W. Petrie, Toronto.
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Hamilton Mach. Tool Co., Hamilton, Ohio.
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H. W. Petrie, Toronto.
Pratt & Whitney Co., Dundas, Ont.
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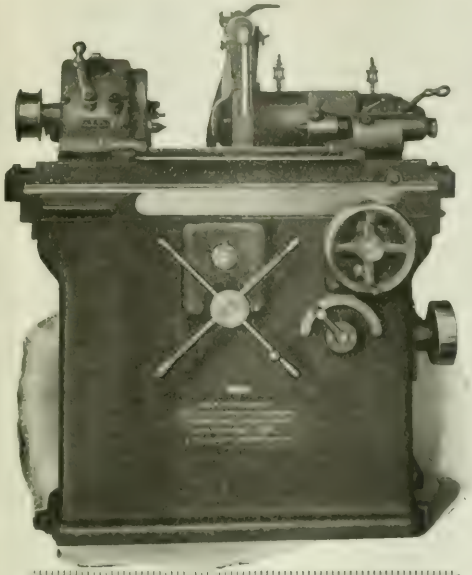


Fitchburg Grinders

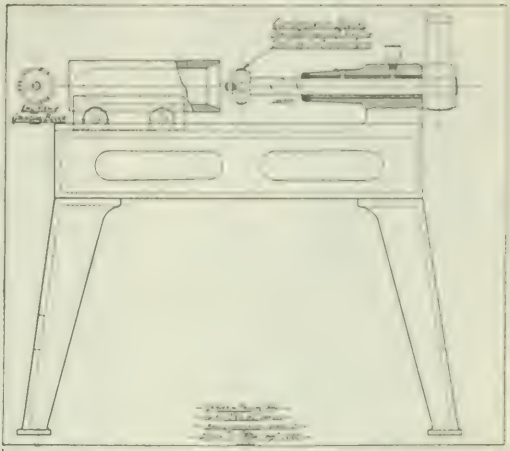
Model "A" illustrated here is a machine whose chief feature is its capacity for size, variety and quality of work. Its speed will give you greater production; its size, convenience, increased production, strength and saving in floor space will effect such a saving as to make it preferable over all other machines of similar character.

It is specially adapted for grinding straight or taper shafts.

An inquiry would speedily get you valuable information and data.

Fitchburg Grinding Machine COMPANY

Fitchburg, Mass., U.S.A.



Smooth Bores

We have designed for our own use a simple and inexpensive grinder to give the final touch to the bore of our shells.

It does the work, and we will have some of these machines on the market shortly.

Write us for our proposition.

Marsh & Henthorn Limited

BELLEVILLE, ONTARIO

Bertrams, Ltd., Edinburgh, Scotland.
Canada Machinery Corp., Galt, Ont.
A. B. Jardine & Co., Hespeler.
Montgomery, Smith & Co., Keynsham, Somerset, Eng.
Niles-Bement-Pond Co., New York.
Toledo Machine & Tool Co., Toledo.

SHEARS, POWER
John Bertram & Sons Co., Dundas.
Bliss, E. W., Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Canada.
Can. Blower & Forge Co., Kitchener, Ont.
Canada Machinery Corp., Galt, Ont
Ferracute Machine Co., Bridgeton, N.J.
National Machy. Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York.
H. W. Petrie, Ltd., Montreal.
H. W. Petrie, Toronto.
Toledo Machine & Tool Co., Toledo.

SHEARS, PNEUMATIC
Toledo Machine & Tool Co., Toledo, Ohio.

SHEARS, SQUARING
Brown, Boggs & Co., Hamilton, Canada.

SHEET METAL WORKING TOOLS
Baird Machine Co., Bridgeport, Conn.
Bliss, E. W., Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Can.
Peck, Stow & Wilcox, Cleveland, O.
Steel Bending Brake Works, Ltd., Chatham, Ont

SHEET METAL STAMPINGS
Dominion Forge & Stpg. Co., Walkerville, Ont.

SHELL BANDING MACHINES, HYDRAULIC
Chapman Double Ball-Bearing Co., Toronto, Ont
Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
The Jenckes Mach. Co., Ltd., Sherbrooke, Que
Metalwood Mfg. Co., Detroit, Mich.
Perrin, Ltd., W. R., Toronto, Ont.
West Tire Setter Co., Rochester, N.Y.

SHELL PAINTING MACHINE
Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Ltd., Galt, Ont.

SHELL RIVETERS
Grant Mfg. & Machine Co., Bridgeport, Conn.
High Speed Hammer Co., Rochester, N.Y.

SHRAPNEL SHELL MARKER
Brown-Boggs Co., Hamilton, Ont.
Noble & Westbrook Mfg. Co., Hartford, Conn.

SIDE TOOLS
Armstrong Bros. Tool Co., Chicago.
Baxter & Co., Ltd., J. R., Montreal, Que.
Can. B. K. Morton, Toronto, Montreal.

SIGNS, ENAMEL
Strong, Kennard & Nutt Co., Cleveland, Ohio.

SILVER SOLDER
Geo. H. Lees & Co., Hamilton, Ont.

SKATE SHARPENERS
Can. Bond Hanger & Cplg. Co., Alexandria, Ont.

SLEDGES
Aikenhead Hardware Co., Toronto, Ont.
Whitman & Barnes Mfg. Co., St. Catharines, Ont.

SLOTTERS
Garvin Machine Co., New York.
National-Acme Co., Cleveland, Ohio.
Niles-Bement-Pond Co., New York.
Rhodes Mfg. Co., Hartford, Conn.

SMOKESTACKS.
The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
MacKinnon, Holmes Co., Sherbrooke, Que.

SOCKETS
Brown & Sharpe Mfg. Co., Providence.
Cleveland Twist Drill Co., Cleveland.
Keystone Mfg. Co., Buffalo, N.Y.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Machine Co., New Bedford
J. H. Williams & Co., Brooklyn, N.Y.

SOCKET HEAD CAP SCREWS
Allen Mfg. Co., Hartford, Conn.

SOLDERING IRONS
Aikenhead Hardware Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Brown, Boggs & Co., Hamilton, Can.

SOLDERS
Aikenhead Hardware Co., Toronto, Ont.
Tallman Brass & Metal Co., Hamilton.

SPECIAL MACHINERY
Baird Machine Co., Bridgeport, Conn.
Banfield, Edwin J., Toronto.
Banfield, W. H., & Sons, Toronto.
Bertram, John, & Sons Co., Dundas.
Bliss, E. W. Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Can
Can. Fairbanks-Morse Co., Montreal.
Charles F. Elmes Eng. Works, Chicago.
Ferracute Mach. Co., Bridgeton, N.J.
Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
Garvin Machine Co., New York.
Gooley & Eglund, Inc., Courtland, N.Y.
Grant Mfg. & Machy. Co., Bridgeport, Conn
John H. Hall & Sons, Brantford.
Gray Mfg. & Mach. Co., Toronto, Ont.
Hamill Machine Co., New York, N.Y.
Hyde Engineering Works, Montreal, Que.
Jardine, A. B. & Co., Hespeler.
The Jenckes Mach. Co., Ltd., Sherbrooke, Que
McClean & Son, F. W., Niagara Falls, Ont.
National-Acme Co., Cleveland, Ohio.
D. McKenzie Machinery Co., Guelph, Ont.
Mulliner & Enlund Tool Co., Syracuse, N.Y.
Prest-O-Lite Co., Inc., Toronto, Ont.
Rhodes Mfg. Co., Hartford, Conn.
Rice & Machinery Depot, Detroit, Mich
Smart-Turner Machine Co., Hamilton, Ont.
T. C. M. Mfg. Co., Harrison, N.J.
Victoria Foundry Co., Ottawa, Ont.
William R. Perrin, Ltd., Toronto.
Winnipeg Gear & Engr. Co., Winnipeg, Man

SPRINGS, MACHINERY
Bristol Wire Spring Co., Bristol, Conn.
Can. Steel Foundries, Ltd., Montreal, Que.
Cleveland Wire Spring Co., Cleveland.
Jas. Steele, Ltd., Guelph, Ont.

SPRING COILING AND WINDING MACHINERY
Baird Machine Co., Bridgeport, Conn.
Garvin Machine Co., New York.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRING MAKING MACHINERY (AUTOMATIC)
Baird Machine Co., Bridgeport, Conn
Sleeper & Hartley, Inc., Worcester, Mass.

SPIRAL CONVEYORS
Can. Matthews Gravity Carrier Co., Toronto, Ont

SPROCKETS, CHAIN
Grant Gear Works, Boston, Mass.
Morse Chain Co., Ithaca, N.Y.
Philadelphia Gear Works, Philadelphia, Pa

SOLDER
Jobborn, Geo. A., Hamilton, Ont.

SPROCKET WHEELS, CAST
Perrin, Wm. R., Toronto.

STAIRS, IRON
Canada Wire & Iron Goods Co., Hamilton, Ont

STAMPINGS
Dillon Mfg. Co., Oshawa, Ont.
Dom. Forge & Stpg. Co., Walkerville, Ont
Homer & Wilson, Hamilton, Ont.

STAMPING MACHINERY
Brown, Boggs & Co., Hamilton, Can.
Canada Machinery Corp., Galt, Ont.
Ferracute Mach. Co., Bridgeton, N.J.
Noble & Westbrook Mfg. Co., Hartford, Conn.

STAMPS, STEEL ALPHABET, FIGURES
Matthews, Jas. H., & Co., Pittsburgh, Pa.
Noble & Westbrook Mfg. Co., Hartford, Conn.
Pritchard-Andrews Co., Ottawa, Can.

STAPLE MACHINES
Sleeper & Hartley, Inc., Worcester, Mass.

STEAM SEPARATORS AND TRAPS
Can. Fairbanks-Morse Co., Montreal
Can. Morehead Mfg. Co., Woodstock, Ont.
H. W. Petrie, Toronto.
Sheldons, Ltd., Galt, Ont.
The Smart-Turner Machine Co., Hamilton.
Sturtevant Co., B. F., Galt, Ont.

STEEL ALLOY (SEE ALLOY STEEL)

STEEL BENDING BRAKES
Steel Bending Brake Works, Ltd., Chatham, Ont.

STEEL FOR AXES, PLOWS, SAWS, DRILLS, ETC.
Colonial Steel Co., Pittsburgh, Pa.

STEEL, CARBON, FERRO-TUNGSTEN
Can. B. K. Morton, Toronto, Montreal.
Colonial Steel Co., Pittsburgh, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Osborn (Canada), Ltd., Sam'l, Montreal, Que.
Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Zenith Coal & Steel Products, Montreal, Que.

STEEL, COLD ROLLED
Can. Drawn Steel Co., Hamilton, Ont.
Union Drawn Steel Co., Hamilton, Ont.

STEEL DRUMS
Smart-Turner Machine Co., Hamilton, Ont.

STEEL PRESSURE BLOWERS
Can. Blower & Forge Co., Kitchener, Ont.
Can. Fairbanks-Morse Co., Montreal.
Sheldons, Ltd., Galt, Ont.
Sturtevant Co., B. F., Galt, Ont.

STEEL, HIGH SPEED
Armstrong Whitworth of Canada, Ltd., Montreal
Can. Fairbanks-Morse Co., Montreal
Can. B. K. Morton, Toronto, Montreal.
Century Steel Co. of America, New York.
Colonial Steel Co., Pittsburgh, Pa.
H. A. Deure Co., Ltd., Montreal.
Fairley Davidson Steel Co., New York, N.Y.
Hawkridge Bros. Co., Boston, Mass.
Latrobe Electric Steel Co., Latrobe, Pa.
Marshall, Geo. A., 70 Lombard, Toronto.
Osborn (Canada), Ltd., Sam'l, Montreal, Que.
H. W. Petrie, Toronto.
Standard Alloys Company, Pittsburgh, Pa.
Vanadium Alloys Steel Co., Pittsburg, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.; represented in Canada by Norton, Callard & Co., Montreal Que.
Zenith Coal & Steel Products, Montreal, Que.

STEELS, HIGH STRENGTH, HOT-WORKING, DIE, MAGNET
Fairley Davidson Steel Co., New York, N.Y.

STEEL, VANADIUM
Drury, H. A., Co., Montreal, Que.
Standard Alloys Co., Pittsburgh, Pa.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vulcan Crucible Steel Co., Aliquippa.

STELLITE, HIGH-SPEED TOOL METAL
Deloro Smelting & Refining Co., Toronto, Ont.

STOCK RACKS FOR BARS, PIPING, ETC.
New Britain Machine Co., New Britain, Conn.

STOCKS FOR DIES
Wells Bros. Co. of Canada, Galt, Ont.

STOCKS, PIPE
Butterfield & Co., Rock Island, Que.

STOOLS, STEEL, SHOP
New Britain Mach. Co., New Britain, Conn.

STRAIGHTENING MACHINERY
Baird Machine Co., Bridgeport, Conn.
Bertrams, Ltd., Edinburgh, Scotland

SWITCHES, RAILWAY
Can. Steel Foundries, Ltd., Montreal.

TACK (DOUBLE POINT) MACHINES
Sleeper & Hartley, Inc., Worcester, Mass.

TANKS, GASOLINE AND OIL
Dominion Forge & Stpg. Co., Walkerville, Ont.
The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
MacKinnon, Holmes & Co., Sherbrooke, Que.

TANKS, STEEL, WATER PRESSURE
Can. Welding Works, Montreal, Que.
Jenckes Mach. Co., Sherbrooke, Que.
MacKinnon, Holmes Co., Sherbrooke
Toronto Iron Works, Ltd., Toronto.

TANK WAGONS
Jenckes Mach. Co., Sherbrooke, Que.
MacKinnon, Holmes Co., Sherbrooke.
Toronto Iron Works, Ltd., Toronto.

TAPES, MEASURING
James Chesterman & Co., Ltd., Sheffield, Eng.

TAPPING MACHINES (PNEUMATIC)
Cleveland Pneumatic Tool Co. of Canada, Toronto.
Greenfield Tap & Die Corp., Greenfield, Mass.

TAPPING MACHINES AND ATTACHMENTS
John Bertram & Sons Co., Dundas.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
The Geometric Tool Co., New Haven.
J. H. Hall & Sons, Brantford, Ont.
A. B. Jardine & Co., Hespeler.
Landis Machine Co., Waynesboro, Pa.
Manufacturers Equipment Co., Chicago, Ill.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit.
Niles-Bement-Pond Co., New York.
Petrie of Montreal, Ltd., H. W., Montreal, Que.
H. W. Petrie, Toronto.
Rickert-Shafer Co., Erie, Pa.
L. S. Starrett Co., Athol, Mass.
Whitney Mfg. Co., Hartford, Conn.

TAPS, ADJUSTABLE
Baxter Co., Ltd., J. R., Montreal, Que.
Geometric Tool Co., New Haven.
Manufacturers Equipment Co., Chicago, Ill.
Murchey Machine & Tool Co., Detroit.
National-Acme Co., Cleveland, Ohio.
Osborn (Canada, Ltd., Sam'l, Montreal, Que.

TAPS, COLLAPSIBLE
Geometric Tool Co., New Haven, Conn.
Manufacturers Equipment Co., Chicago, Ill.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit, Mich.
Osborn (Canada, Ltd., Sam'l, Montreal, Que.
Victor Tool Co., Waynesboro, Pa.

TAPS, DIES AND WRENCHES
Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal
Cleveland Twist Drill Co., Cleveland.
Foss & Hill Machy. Co., Montreal.
Geometric Tool Co., New Haven, Conn.
A. B. Jardine & Co., Hespeler.
Morse Twist Drill & Machine Co., New Bedford.
Murchey Machine & Tool Co., Detroit.
Osborn (Canada, Ltd., Sam'l, Montreal, Que.
Petrie of Montreal, Ltd., H. W., Montreal, Que.
H. W. Petrie, Toronto.
Pratt & Whitney Co., Dundas, Ont.
L. S. Starrett Co., Athol, Mass.
Wells Bros. Co. of Canada, Galt, Ont.

TAP EXTENSIONS
Allen Mfg. Co., Hartford, Conn.

TESTING INSTRUMENTS

METALLURGICAL
Shore Instrument & Mfg. Co., New York City.

THERMOMETERS, ALL KINDS
Taylor Instrument Co., Rochester, N.Y.
Bellevue Industrial Furnace Co., Detroit, Mich.

TESTING LABORATORIES
Can. Inspection & Testing Lab., Montreal, Que.
Toronto Testing Laboratory, Toronto.

THREAD-CUTTING MACHINES
Can. Fairbanks-Morse Co., Montreal.
Curtis & Curtis Co., Bridgeport, Conn.
Garlock-Walker Machy. Co., Toronto, Ont.
Geometric Tool Co., New Haven, Conn.
Landis Machine Co., Waynesboro, Pa.
National-Acme Co., Cleveland, Ohio.
National Machy. Co., Tiffin, Ohio.
H. W. Petrie, Ltd., Toronto, Ont.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co. of Canada, Galt, Ont.

THREADING TOOLS
Rivett Lathe & Grinder Co., Brighton, Mass.

THREAD MILLING MACHINES
Gray Mfg. & Mach. Co., Toronto, Ont.
Taft-Peirce Co., New York, N.Y.
T. C. M. Mfg. Co., Harrison, N.J.

TINSMITHS' TOOLS
Brown, Boggs & Co., Hamilton, Can.
Steel Bending Brake Works, Ltd., Chatham, Ont.
Peck, Stow & Wilcox, Cleveland, Ohio.

TIRE SETTING MACHINES, HYDRAULIC
William R. Perrin, Ltd., Toronto.
West Tire Setter Co., Rochester, N.Y.

TOOL CASES
Union Tool Chest Works, Rochester, N.Y.

TOOL HOLDERS
Aikenhead Hardware Co., Toronto, Ont.
Armstrong Bros. Tool Co., Chicago.
Cleveland Twist Drill Co., Cleveland.
Can. B. K. Morton, Toronto, Montreal.
Deloro Smelting & Refining Co., Toronto, Ont.
Modern Tool Co., Erie, Pa.
Pratt & Whitney Co., Dundas, Ont.
J. H. Williams & Co., Brooklyn, N.Y.

TOOL POSTS, LATHE
Armstrong Bros. Tool Co., Chicago.

TOOL ROOM PARTITIONS
Canada Wire & Iron Goods Co., Hamilton.

TOOL STEEL
Atkins & Co., Wm., Sheffield, Eng.
Armstrong, Whitworth, Ltd. of Canada, Montreal.
Can. Fairbanks-Morse Co., Montreal
Can. B. K. Morton, Toronto, Montreal.
Colonial Steel Co., Pittsburgh, Pa.
Deloro Smelting & Refining Co., Toronto, Ont.
H. A. Deure Co., Montreal.
Hawkridge Bros. Co., Boston, Mass.
Latrobe Electric Steel Co., Latrobe, Pa.
Marshall, Geo. A., 70 Lombard, Toronto.

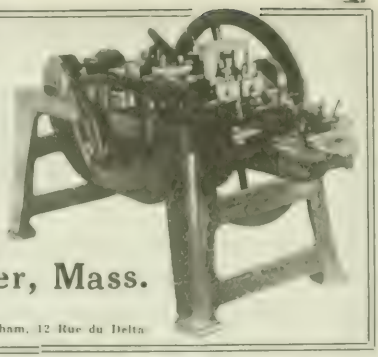
MAKE NAILS! NOT NOISE!

We offer the trade new types of

WIRE NAIL MACHINES

QUIET IN OPERATION, WITH VERY HIGH OUTPUT; ALL PARTS ACCESSIBLE; DECREASED MAINTENANCE COSTS; GREAT CAPACITY; OCCUPYING SMALL FLOOR SPACE.

Smoothly running [illegible] with balanced mechanical motions and no rotating cams. Built in [illegible] sizes from No. 17 to 8 in. diam.



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London, England, F. A. Perry, 63 Queen Victoria Street, E.C. 4. Paris, France, Edgar Bloxham, 12 Rue du Delta

Osborn Canada, L. J., Sorel, Montreal, Que.
H. W. Petrie, Ltd., Toronto, Ont.
Swedish Steel & Importing Co., Montreal, Que.
Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

TOOLS, ELECTRIC

Independent Pneumatic Tool Co., Chicago, Ill.
H. W. Petrie, Ltd., Montreal.
R. E. T. Pringle, Ltd., Toronto, Ont.
Stow Mfg. Co., Binghamton, N.Y.
A. R. Williams Machy. Co., Toronto.
United States Elec. Tool Co., Cincinnati, O.

TOOLS, PNEUMATIC

Can. Ingersoll-Rand Co., Sherbrooke, Que.
Cleveland Pneumatic Tool Co. of Canada, Toronto
Curtis Pneumatic Machinery Co., St. Louis, Mo
Garlock-Walker Machinery Co., Toronto, Ont.
Independent Pneumatic Tool Co., Chicago, Ill.

TOOLS, LATHE, PLANER, SLOTTER

Armstrong Bros. Tool Co., Chicago.

TOOLS, SCREW MACHINE

Foster Machine Tool Co., Elkhart, Ind.

TORCHES, STEEL

Armstrong Whitworth of Canada, Ltd., Montreal
Prest-O-Lite Co., Inc., Toronto, Ont.

TRACK SYSTEMS

Dillon Mfg. Co., Oshawa, Ont.
Northern Crane Works, Walkerville.
Whiting Foundry Equipment Co., Harvey, Ill.

TRANSMISSION MACHINERY

American Pulley Co., Philadelphia, Pa.
A. R. Williams Machy. Co., Toronto.
Can. Bond Hanger & Cplg. Co., Alexandria, Ont.
Can. Fairbanks-Morse Co., Montreal.
Can. Drawn Steel Co., Hamilton, Ont.
Hamilton Gear & Mach. Co., Toronto.
Morse Chain Co., Ithaca, N.Y.
H. W. Petrie, Ltd., Toronto, Ont.
The Smart-Turner Machine Co., Hamilton.

TRANSMISSION TOWERS

Curtis Pneumatic Machinery Co., St. Louis, Mo
Northern Crane Works, Walkerville.
Tallman Brass & Metal Co., Hamilton.

TRUCKS, FACTORY, FREIGHT, ETC

Canada Machinery Corp., Galt, Ont.
Chapman Double Ball Bearing Co., Toronto.
Whiting Foundry Equipment Co., Harvey, Ill.

TRUCKS, LUMBER AND KILN

Sheldons, Ltd., Galt, Ont.
Northern Crane Works, Walkerville.

TUBING, SEAMLESS, BRASS & COPPER

Standard Tube & Fittings Co., Windsor, Ont.

TUMBLING BARRELS

Baird Machine Co., Bridgeport, Conn.
Northern Crane Works, Walkerville.
Whiting Foundry Equipment Co., Harvey, Ill.

TUNGSTEN FILAMENT COILING MACHINERY

Sleeper & Hartley, Inc., Worcester, Mass.

TURNBUCKLES

Canadian Bridge & Structural Ltd., Welland.

TURNTABLES

Whiting Foundry Equipment Co., Harvey, Ill.

TURRET MACHINES

Brown & Sharpe Mfg. Co., Providence, R.I.
Garvey Mach. Co., Toronto, Ont.
New Haven Mch. Co., New Haven, Conn.
H. W. Petrie, Toronto.
Pratt & Whitney Co., Hartford, Conn.
Ryder & Worthington, Detroit, Mich.
Warner & Swasey Co., Cleveland, O.
Garvey Machine Co., New York.

TURBINE WATER WHEELS

James Leffel & Co., Springfield, O.
The Jonckes Mach. Co., Ltd., Sherbrooke, Que.
Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.

UPSETTING AND BENDING MACHINERY

John Perrins & Son, Dudley, England
Baird Machine Co., Bridgeport, Conn.
A. E. Jacobs & Co., Sydney, N.S.
Newton Machine Tool Works, Philadelphia, Pa.
Canada Machinery Corp., Galt, Ont.
New Haven Mch. Co., New Haven, Conn.
The Jonckes Mach. Co., Ltd., Sherbrooke, Que.
Petrie of Montreal, Ltd., H. W., Montreal, Que.
H. W. Petrie, Ltd., Toronto, Ont.
A. R. Williams Machy. Co., Toronto.

VACUUM PUMPS

Can. Blower & Forge Co., Kitchener, Ont.
Smart-Turner Machine Co., Hamilton, Ont.

VALVE LEATHERS

Can. B. K. Morton, Toronto, Montreal.
Graton & Knight Mfg. Co., Montreal.

VALVE GRINDERS (PNEUMATIC)

Cleveland Pneumatic Tool Co. of Canada, Toronto

VALVES, FOOT

Smart-Turner Mach. Co., Hamilton.

VALVES, HYDRAULIC

Charles F. Elmes Eng. Works, Chicago, Ill.
Metalwood Mfg. Co., Detroit, Mich.

VALVES, BACK PRESSURE, STEAM

Sheldons, Limited, Galt, Ont.

VENTILATING APPARATUS

Brantford Oven & Rack Co., Brantford, Ont.
Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Limited, Galt.
H. W. Petrie, Toronto.
Sturtevant Co., B. F., Galt, Ont.
A. R. Williams Machy. Co., Toronto.

VISES, AIR OPERATED

Hannifin Mfg. Co., Chicago, Ill.

VISE STANDS, PORTABLE

New Britain Mach. Co., New Britain, Conn.

VISES, BENCH

Aikenhead Hardware Co., Toronto, Ont.
Becker Milling Machine Co., Boston, Mass.
Foss & Hill Machy. Co., Montreal.
New Britain Machine Co., New Britain, Conn.
H. W. Petrie, Ltd., Montreal.
H. W. Petrie, Toronto.

VISES, PIPE

Aikenhead Hardware Co., Toronto, Ont.
Rutterfield & Co., Rock Island, Que.
J. H. Williams & Co., Brooklyn, N.Y.

VISES, PLANER AND SHAPER

Aikenhead Hardware Co., Toronto, Ont.
Skinner Chuck Co., New Britain, Conn.

WASHER MACHINES

National Machy. Co., Tiffin, Ohio.

WASHERS

Barnes Wallace, Co., Bristol, Conn.
Dillon Mfg. Co., Oshawa, Ont.
Graton & Knight Mfg. Co., Worcester, Mass.
Hungerford Brass & Copper Co., New York, N.Y.
London Belt & Hose Works, London, Ont.
Steel Co. of Canada, Ltd., Hamilton, Ont.

WATER PURIFYING AND SOFTENING APPARATUS

Wm. B. Scaife & Sons Co., Pittsburgh, Pa.

WATER CINDER MILLS

Whiting Foundry Equipment Co., Harvey, Ill.

WATER JACKETS

Can. Welding Works, Montreal, Que.

WATER TOWERS

The Jonckes Mach. Co., Ltd., Sherbrooke, Que.
Toronto Iron Works, Ltd., Toronto.

WATER WHEELS

The Jonckes Mach. Co., Ltd., Sherbrooke, Que.
Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.

WAVING AND UNDERCUTTING MACHINES AND ATTACHMENTS

Garvey Mach. Co., Toronto, Ont.

WELDING MASKS

WELDERS, ELECTRIC, SPOT, BUTT, ETC

Canada Machinery Corp., Galt, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Can. Westinghouse Co., Hamilton, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Lunn, [illegible]
Northern Crane Works, Walkerville, Ont.

WELDING WORK AND SUPPLIES

Autogenous and Oxy-Acetylene — SEE

OXY-ACETYLENE WELDING

John H. Hall & Sons, Brantford.
Kennedy & Sons, Wm., Owen Sound, Ont.
Northern Crane Works, Walkerville.

WIRE COILING AND POINTING MACHINERY

Baird Machine Co., Bridgeport, Conn.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE CLOTH AND PERFORATED METALS

Canada Wire & Iron Goods Co., Hamilton.

WIRE FORMING AND STAMPING MACHINERY

Baird Machine Co., Bridgeport, Conn.
Brown Bogle Co., Ltd., Hamilton, Canada.
McClean & Son, F. W., Niagara Falls, Ont.
F. B. Shuster Co., New Haven, Conn.

WIRE NAILS

Parmenter & Bulloch Co., Gananoque.
Steel Co. of Canada, Ltd., Hamilton, Ont.

WIRE NAIL MACHINERY

National Machy. Co., Tiffin, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
A. R. Williams Machy. Co., Toronto.

WIRE, STEEL, BRASS, COPPER, BRONZE

Steel Co. of Canada, Ltd., Hamilton, Ont.

WOOD BORING MACHINES

Canada Machinery Corp., Galt, Ont.
Cleveland Pneumatic Tool Co. of Canada, Toronto
Garlock-Walker Machinery Co., Toronto.
Petrie of Montreal, Ltd., H. W., Montreal, Que.
H. W. Petrie, Toronto.

WIRE STRAIGHTENERS AND CUTTERS

Baird Machine Co., Bridgeport, Conn.
Brown Bogle Co., Ltd., Hamilton, Canada.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

WOODWORKING MACHINERY

Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Garlock-Walker Machinery Co., Toronto.
New Britain Machine Co., New Britain, Conn.
H. W. Petrie, Toronto.
Petrie of Montreal, Ltd., H. W., Montreal, Que.
R. E. T. Pringle, Ltd., Toronto, Ont.
Sloan Mfg., Selkirk, [illegible]
A. R. Williams Machy. Co., Toronto.

WOOD LATHES

Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Oliver Machy. Co., Grand Rapids, Mich.

WORKS STANDS, PORTABLE

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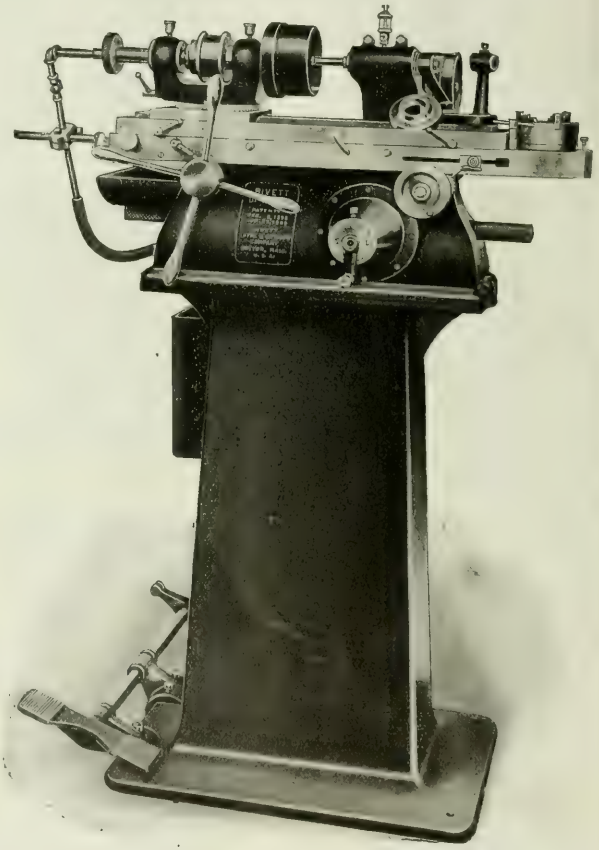

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A weekly newspaper devoted to the machinery and manufacturing interests.

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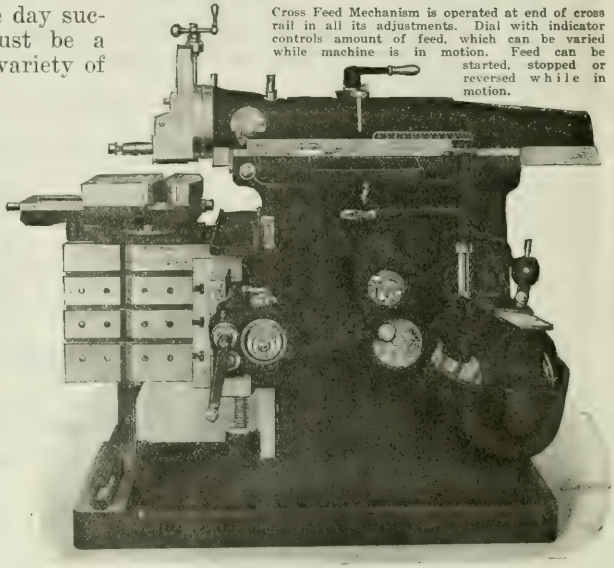

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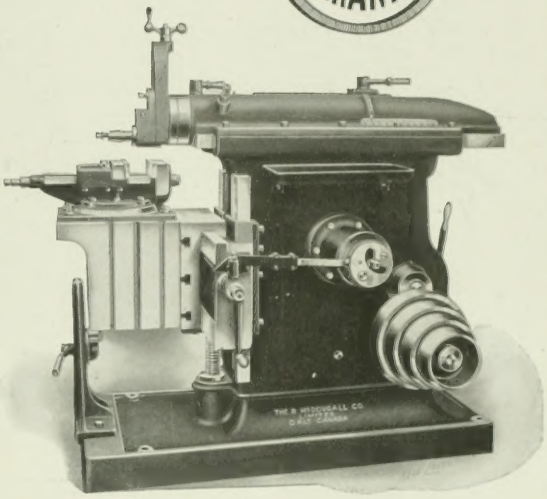

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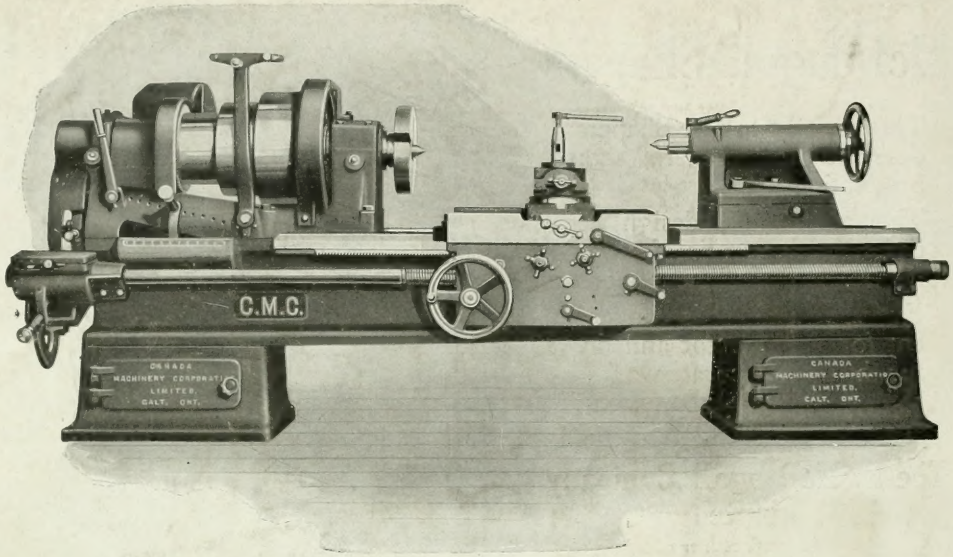

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